AAR
MEETINGS
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RAILWAY

LOCOMOTIVES AND CARS

A CHANGE S BOARDMAN TIME-SAVER PUBLICATION

JUNE 1960



General Electric 2,500-hp Diesel for U.S. Service...page 25

HAVE AN UNPARALLELED RECORD OF **PERFORMANCE** AND **ENDURANCE**

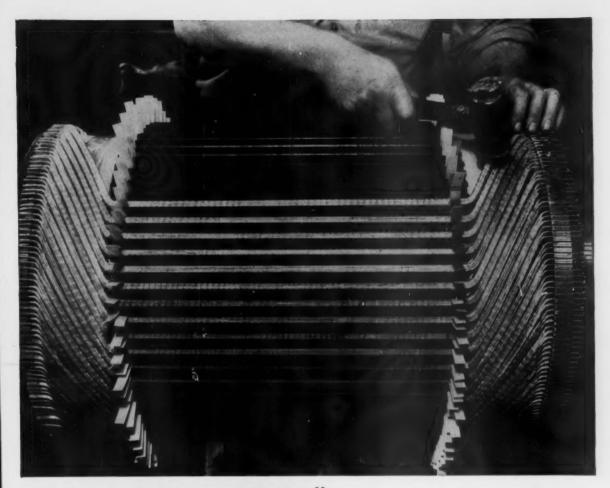
CLASS A-22XL



CLASS RF-333



W. H. MINER, INC. CHICAGO



NEW NECCOBOND* ARMATURE COIL adds life to traction motors...cuts rewind time

NECCOBOND is National Electric Coil's name for a new and improved insulation system developed in its own laboratories. Neccobond has been applied to traction armature coils offering these advantages:

Cooler operation, due to rapid heat transfer from void-free insulation.

Greater wear-resistance, due to high mechanical strength.

Excellent moisture resistance, because of complete encapsulation.

Easier, faster winding, due to a high degree of uniformity.

Call in your nearby National Electric Coil field engineer for complete information, then order a trial quantity of Neccobond armature coils. Prove to your own satisfaction that these coils add life to your traction motors...cut rewind time...save money!

*Neccobond armature coils are insulated with mica and glass, pre-impregnated with a catalytic-

pre-impregnated with a catalytictype, high temperature resin. Controlled curing then produces an insulating wall with markedly improved characteristics.





National Electric Coil

DIVISION OF MCGRAW-EDISON COMPANY

ELECTRICAL ENGINEERS . MANUFACTURERS OF ELECTRICAL COILS, INSULATION, LIFTING MAGNETS . REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES

#RICTION ACTION

means

REDUCED CLAIMS

Two "shock-stopping"
Friction clutch mechanisms
give Extra Measure of

Protection to Lading...

There's a good reason for it... Exclusive Peerless Twin Friction clutch mechanisms combined with 4 powerful springs, reduce damage claims by more effectively absorbing shocks—more efficiently dissipating impact energy... Lower transmittal ratio keeps lading protected from dangerous impact shocks... Chances of jamming due to severe impact are greatly reduced because of independent nest operation—You get an Extra Measure of Protection that means reduced damage claims.

Inspection of every Peerless component before assembly and complete testing after assembly assures consistent dependability. Write for the complete Peerless TWIN FRICTION ACTION story—Ask for Bulletin T-1.

PEERLESS EQUIPMENT

Division of Poor & Co. 332 South Michigan Avenue • Chicago 4, Illinois

PEERLESS

RAILWAY

LOCO-**MOTIVES** CARS

America's Oldest Trade Paper

June 1960-Vol. 134, No. 6

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POSTMASTER—SEND FORM 3579 TO EM-METT ST., BRISTOL, CONN.

REPORT FOR JUNE

AIEE Summer General Meeting

The 1960 Summer General Meeting of the American Institute of Electrical Engineers will be held at the Chalfonte-Haddon Hall Hotels at Atlantic City, June 22 and 23. For this meeting, the Land Transportation Committee has the following program.

Wednesday, June 22

2 p.m. Economics of Electric Traction in Philadelphia-E. L. Tennyson, Department of Public Property, City of Philadelphia.

Philadelphia Welcomes the First Fleet of Stainless-Steel Rapid Transit Cars-G. H. Smith, Philadelphia Transportation Co.

The First Fleet of Stainless-Steel Rapid Transit Cars—L. F. Reynolds, Budd Co. Thursday, June 23

9 a.m. Progress Report on Traction Motor Insulation-C. A. Burkhart and J. K. Wentz, General Electric Co.

Extension of Epomica Insulation to Light Traction Motors-J. W. Clokey and J. R. Shirley, Westinghouse Electric Corp.

Diesel-Electric Locomotive Excitation Systems-A. V. Johansson, General Elec-

Static Voltage Regulators-R. K. Allen and W. B. Zelina, General Electric Co.

2 p.m. Electrically Operated Railroad Switch Lamps-Harold L. Folley and William A. Costello, Western Railroad Supply Co.

Modern Light Sources for the Railroad Industry-R. D. Churchill and R. L. Henderson, General Electric Co.

Catenary Mounted Luminaires for Railroad Yard Lighting-A. W. Herman, Line Material Industries.

D&RGW Diesels Using Gilsonite Fuel

Feasibility of the fuel for diesel engines was established as the result of year-long testing by the research and operating departments of the Rio Grande. The project was instituted when it became apparent that the process developed to refine Gilsonite ore was capable of producing several grades of fuel as well as coke.

Gilsonite is mined in eastern Utah and pumped 72 miles in slurry form to the refinery near Grand Junction, Colo. Beyond its continuing policy of seeking new ways to develop more efficient and economical operation, the Rio Grande points out that development of a new market for a Gilsonite product is mutually advantageous because American Gilsonite is a good railroad customer.

(Turn to page 10)

TIME SAVINGS IDEAS FOR JUNE

MOTIVE POWER AND CAR

U25B: 2,500-Hp General Electric Road Switcher Southern Aluminum Covered Hoppers in Service 28 'Auto-Pack' Developed for Southern Pacific 30 Hydraulic Drive and 2,000-Hp Diesel 35 Union Tank Builds 30,000-Gal Cars CNR Speeds Car Exterior Cleaning 42 How Seaboard Uses Steel-Corr AAR Mechanical Division Program and Exhibits Milwaukee Improves Its Wheel Mounting 50 Spot Repair System Serves L&N Boyles Yard How ACL Simplifies AAR Billing No Smoking, Please! (Mechanical Reefer Series) New Problems in Car Interchange ELECTRICAL Simplifying Locomotive Control (Western Maryland) 70 AAR Electrical Section Program 73 Armature Finishing and Inspection (Roll Them Out Like New) 74
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AAR Electrical Section Program
Armature Finishing and Inspection (Roll Them Out Like New)
Doc Bets on a Giraffe (Diesel Maintainers Note Book)
DEPARTMENTS
Personal Mention
Supply Trade Notes

NEW Column wear plate with high weldability

Steel composition and heat treatment developed for wear resistance, yet the plate is readily weldable.

NEW Wing shoe is shell-molded wear resistance

Larger areas—plus ASF's precision casting process that results in smoother surfaces and closer tolerances. New longer-wearing steel, too.

NEW Superior bolster control

Longitudinal, lateral and rotary movement of bolster are under constant control. Ride Control elements stay in proper position for improved ride and increased truck life.

NEW Larger friction-control surfaces

Larger angle surfaces on bolster and larger shoe equalize wear for longer truck life.



Ride Control fruck

Bio

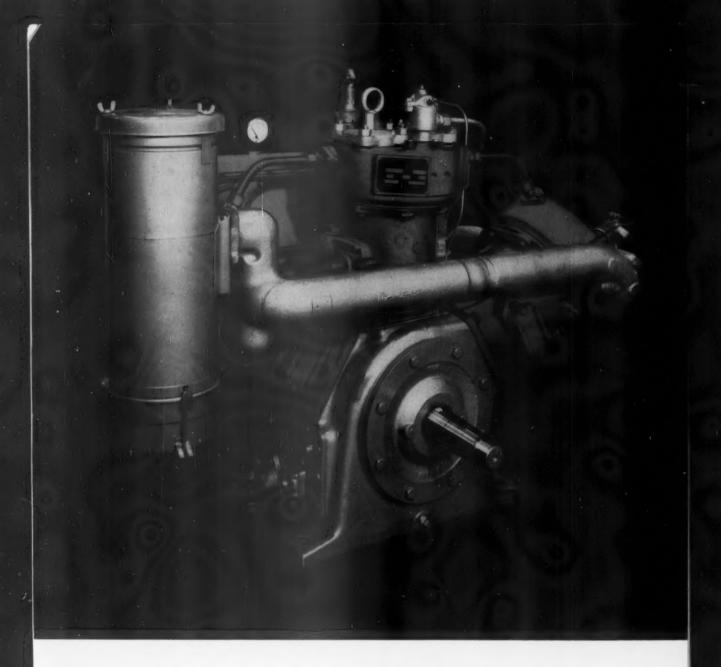
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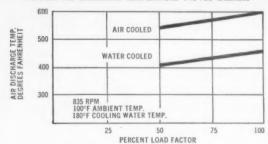
Canadian Manufacturer and Licensee: International Equipment Co., Ltd., Mantreal 1, Quebec Other Foreign Sales: American Steel Foundries, International, S.A., Chicago

New ASF Ride Control Truck gives you larger bearing areas, better shoe and bolster action. Result: Longer truck life.

Based on 20 years' experience with Ride Control Trucks and continuing research, American Steel Foundries has designed the new ASF Ride Control Truck to answer your needs for a lasting smooth ride. Bearing areas have been increased, critical wear points now last longer than ever. Shoe and bolster interaction has been improved, bolster shift minimized. You get balanced wear with lower maintenance costs because of longer life of the component truck parts. The new ASF Ride Control Truck has been tested and proved in action on the ASF Service Laboratory Test Train, and is ready to give you even better service.



REDUCES AIR DISCHARGE TEMPERATURE 145-150 DEGREES



This graph illustrates how the water-cooled air compressor operates cooler even when the load factor is increased steadily.

ELECTRO-MOTIVE AIR COMPRESSOR CONVERSION KITS

LOCOMOTIVE	From Air Cooled Compressor	To Water Cooled Compressor	Conversion Kit Part No.	Cooling System Piping Drawing	
GP	WXE WXO	WBO*	8237123 8237123	8242802 8242802	
F "A"	WXE WXO	WBO* WBO	8237123 8237123	L-8470 L-8470	
F "B"	WXE WXD	WBO*	8237123 8237123	L-8472 L-8472	
E	ADX ADJ	ABO ABO	8243460 8243460	8236521 8236521	

*REQUIRES TWO HIGH CAPACITY LOW PRESSURE PISTONS IN ADDITION TO KIT REFERENCE: CATALOG 90 PARTS GROUP 1100

Present model air compressors can be converted to efficient, low maintenance water cooling. For further information, contact your Electro-Motive representative.

Converts air-cooled compressors to water cooling for extended life, lower maintenance

Continuous operation at a 100% load factor

Present day operations place heavier demands on air compressor performance. To match these conditions, Electro-Motive has developed air-to-water conversion kits to assure top compressor performance under the most severe and continuous operating conditions. Temperature remains constant, even at a 100% load factor. Water cooling substantially improves efficiency, while reducing maintenance requirements.

Eliminates damaging oil breakdown

High-temperature operation of air-cooled compressors causes vaporization of lubricating

oils which can penetrate brake systems and damage hose and valve parts. The constant temperature feature of a water-cooled compressor eliminates oil vaporization. Water cooling also provides better lubrication of compressor parts by maintaining constant viscosity, thus checking varnishing and reducing oil waste.

Simple, economical installation

Air-to-water conversion is accomplished very simply and inexpensively. Electro-Motive kits contain all necessary component parts for conversion—new cylinders, cylinder heads, intercooler and manifold assemblies. With a small amount of additional piping, the compressor obtains its coolant from the engine cooling system.

Immediate delivery

Electro-Motive's nine on-line warehouses offer convenient, prompt delivery of water-cooled conversion kits:

Los Angeles, California

St. Paul, Minnesota Halethorpe,

Emeryville, California

Maryland

North Salt Lake, Utah Fort Worth, Texas Jacksonville, Florida Hazelwood, Missouri

La Grange, Illinois (factory and parts center)





ELECTRO-MOTIVE DIVISION

GENERAL MOTORS . LA GRANGE, ILLINOIS

Home of the Diesel Locomotive

In Canada: General Motors Diesel Limited, London, Ontario

(Continued from page 5)

Flat-Back Bearings in Interchange

Service tests of flat-back, solid journal bearings have been authorized by the AAR Committee on Lubrication of Cars and Locomotives Installations in interchange service can total up to 6,000 carsets with current authorizations. These include 5,000 sets to be produced by American Brake Shoe and 1,000 sets by Magnus Metals.

Cars with the new bearing will be stencilled "Test-Flat Back Bearings" and any failures are to be reported to the car owner. Periodic performance reports will be submitted to the AAR.

Decelostat and Equalizer Cases Decided by Arbitration

Responsibility for a missing decelostat and also for damage to a car caused by the breaking of one of its equalizers was established by recent decisions of the AAR Mechanical Division's Arbitration Committee.

A decelostat was missing from a Pennsylvania passenger car when the Atlantic Coast Line delivered it to the Florida East Coast in a Chicago-Miami train at Jacksonville, Fla., on March 23, 1958. The car was subsequently repaired at the FEC's Miami shop, and that road requested a defect card from the Atlantic Coast Line for the missing material under Passenger Car Interchange Rule 4. ACL contended that decelostats were not covered in the interchange rule, that it had been unable to get defect cards from delivering roads under the same conditions, and that the defect was an owner's responsibility.

While the ACL indicated that the decelostat was already missing when the car came on its line from the Louisville & Nashville at Montgomery, Ala., the FEC stated that it was interested only in the fact that the missing material was an ACL (delivering line) responsibility as far as it was concerned. In Arbitration Case 1857, the Committee ruled that "missing decelostat is not included in Passenger Car Interchange Rule 8, Paragraph 17-g as a delivering line defect." ACL contention was sustained.

BROKEN EQUALIZER

Breaking of an equalizer on a heavy-duty flat car owned by the Bessemer & Lake Erie while moving on the Erie Railroad at Galion, Ohio, became the subject of Arbitration Case 1859. Extensive damage to the car was indicated on the Erie defect card and the car was returned to the Bessemer shop at Greenville, Pa. Later the Bessemer requested another defect card for uncarded, associated damage. The Erie rejected this and requested that the first card be returned for cancellation because examination in the Erie laboratory showed that the equalizer material did not meet AAR Specification M-126, Grade E. Return of the first card was refused by the B&LE which stated that findings of an independent laboratory showed that equalizer grade material was involved. The Bessemer contended that be-(Continued on page 15)

Orders and Inquiries for New Equipment

Placed Since the Closing of the May Issue

Diesel-Electric Locomotive Orders

Road and builder	No. and horsepower		Service		Detail	
SEABOARD AIR LINE: Alco Products	10	1,800	Road	Switcher	Deliveries begin this month.	
Electro-Motive	10	1,800	Road	Switcher	For August delivery. Total cost of 20 locomotives in two orders, \$3,790,000.	

Freight-Car Orders

Road and builder No. of cars	Type of car	Details
ATLANTIC COAST LINE: American Car & Fdry300	Gondola	70-ton.
200	Wet rock	70-ton.
100	Box	50-ft, 70-ton.
Greenville Steel Car 200	Wood chip	70-ton.
Pullman-Standard 200	Hopper	70-ton. Total of 1,000 cars in these orders
	Поррег	to have roller bearings. Deliveries July- September.
Baltimore & Ohio: Company shops 12	Cabooses	For delivery late this year.
RUBLINGTON:		
Company shops100	Box	40½-ft, 50-ton, with lading protection devices.
500	Hopper	70-ton. (Carried over from 1959 program).
30	Cabooses	
General American100	Covered hopper	70-ton Dry-Flo.
50	Covered hopper	70-ton Airslide.
North American Car140	Livestock	40-ft, double-deck. Being delivered. On lease for five-year period.
CHESAPEAKE & OHIO: General American 25	Covered hopper	Base unit cost, \$13,200. For third quarter delivery.
CHICAGO & EASTERN ILLINOIS: Pullman-Standard 33	Box	50-ton, DF. For third quarter delivery.
E. I. DU PONT DE NEMOURS: General American 100	Covered hoppers	70-ton.
GREAT NORTHERN: General American20	Covered hoppers	Airslide. For late summer delivery.
NORFOLK & WESTERN: 15	Gondola	53-ft. Each car to carry 14 135-cu-ft containers for lime and similar commodities. To cost approx. \$300,000.
RAIL TRAILER: American Car & Fdry. 26	Piggyback flat	85-ft, roller bearing. 25 on lease to Erie. 26th car to be used as demonstrator.
250	Piggyback flat	These and those on order from Bethle- hem and Pullman-Standard to be 85-ft and cost approx. \$7,550,000. For June- July delivery.
Bethlehem Steel100	Piggyback flat	bully desirecy.
Pullman-Standard150	Piggyback flat	
SANTA FE:		
Company shops300 200 200	Box Insulated box Auto box	700 box cars being built in company shops to have Shock Control under- frames.
150	Flat	53-ft.
General American 500	Mech. reefers	00-10.
Greenville Steel Car150	Hopper	70-ton.
Magor Car 300	Gondolas	10-001.
RIO GRANDE:		
(Builders unnamed)200	Hopper	70-ton.
(Builders unnamed) 50	Flat	50-ton, 53-ft 6-in., roller-bearing, with reinforced bulkhead ends.
25	Covered hopper	70-ton.
SOUTHERN: Pullman-Standard 200	Box	50-ft, with cushioned underframes and special hydraulic absorption device to protect car and lading from coupling shocks. Cost, \$3,400,000. Deliveries to start in July.
Southern Pacific: American Car & Fdry100	Hopper	95-ton, with aluminum bodies and steel
The state of the s	**opper	underframes. For use in Texas sulphur

Notes and Inquiries

General American plans expenditure of approx. \$30,000,000 in 1960 primarily for fleet equipment, to include tank cars and Dry-Flo and Airslide covered hopper cars.

Milucaukee plans purchase of 75 double-deck suburban coaches at cost of approx. \$13,125,000, provided fare increases sufficient to support such program can be obtained.

New York City Transit Authority will ask Board of Estimate for \$10,000,000 next year to buy 80 IRT subway cars to transport visitors to 1964 World's Fair at Flushing Meadow. Special order would be in addition to 100 IRT cars, costing approx. \$12,000,000, for which the authority originally planned to seek funds in 1961.

Santa Fe has ordered 25 baggage-car shells from Pullman-Standard. Construction to be completed in company shops. Deliveries to begin this month.

For the Norfolk and Western— First new General Motors GP-18 locomotives

THE CHANGE CHANGE CHANGE COMPANIES CHANGE CH CARRIE .. CRACE, ... STREET. THE PERSON NAMED AND POST OF THE PERSON NORFOLK AND WESTERN The first of the new General Motors GP-18 locomotives have been delivered to the Norfolk and Western Railway. A four-unit consist of these units is pictured here on a typical heavy-tonnage coal haul. The GP-18's greater fuel economy and reduced maintenance features will help the N & W maintain fast, efficient service at much lower locomotive operating cost. For more facts on the GP-18, turn page.





Delivery of twenty-four GP-18 locomotives to the Norfolk and Western completes a group of 192 General Motors units delivered to this road over the past year and a half—largest single order for General Purpose type units. One of the new 1800 hp GP-18 units is pictured here prior to shipment from the Electro-Motive plant in La Grange, Illinois.

The GP-18 closely resembles past General Motors General Purpose locomotives in size and appearance. It measures 56 feet from coupler to coupler. Height is 15 feet and width is 10 feet. The GP-18:

General Purpose versatility, lower operating and maintenance costs

The GP-18 is a cost-cutter. To the versatility of the General Purpose locomotive, the GP-18 offers new features that measurably reduce costs in two vital areas—fuel consumption and scheduled maintenance.

Lower fuel consumption. The 567D-1 engine in the GP-18 is even tougher, more reliable and longer-lived than the famous "C" engine that it replaces. It is more efficient, capable of producing equivalent horsepower on five-percent less fuel. New Electro-Motive fuel-saving needle valve injectors combine with a revolutionary 20:1 compression ratio to provide this reduction in specific fuel consumption.

60% reduction in scheduled maintenance. The GP-18 contains more than thirty new and improved parts and components that permit reduction of scheduled maintenance requirements up to sixty percent. The effectiveness of these items to reduce such maintenance by more than half, has been demonstrated in actual road service.

New electro-magnetic control apparatus in a dirt-free cabinet completely eliminates the maintenance required of previous electropneumatic control equipment. Sealed bearings, new insulation and other improvements have increased service life of the new main generator by fifty percent. A watercooled air compressor, improved traction motors, better oil filters, oil seals—all contribute to the remarkable economy of the GP-18. All new General Motors road locomotives contain these maintenance reduction features.

For new or replacement power. The GP-18, with four-wheel truck design, will integrate readily with present motive power equipment, operations and methods. Older 4-wheel truck units (GM "F" and "GP" models) may be turned in for GP-18 locomotives at substantial savings on Electro-Motive's Locomotive Replacement Programs. For specific details, contact your Electro-Motive representative.

ELECTRO-MOTIVE DIVISION GENERAL MOTORS - LA GRANGE ILLINOIS

Home of the Diesel Locomotive

In Canada: General Motors Diesel Limited, London, Ontario



Now is the time for a giant stride in motive power . . .



Get fast, safe, effective cleaning with

AEROMASH-A

all-purpose liquid cleaner for painted surfaces

HERE'S A NEW PRODUCT that will get all of your painted surfaces cleaner than ever before—yet is completely safe on paint!

Clean diesel exteriors with Aerowash-A! It's ideal for either hand brushing or machine cleaning.

Clean interiors with Aerowash-A! There's no fire hazard when you use Aerowash-A. And your crew will like its pleasant odor. Ideal for both diesels and passenger cars.

Reduce labor costs with Aerowash-A! The faster, more effective cleaning action of Aerowash-A means your men can do the job in less time. And there's no powder to dissolve. Just dilute it and it's ready to go. What's more, Aerowash-A can even be piped directly into automatic cleaning operations.

Get more details on Aerowash-A now . . . just ask your Wyandotte cleaning specialist. Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California, and Atlanta, Georgia. Offices in principal cities.



J. B. FORD DIVISION

SPECIALISTS IN RAILROAD CLEANING PRODUCTS

(Continued from page 10)

cause the car was in the possession of the Erie at the time of derailment, it was an Erie responsibility. This was upheld in Case 1859 which stated that "under provisions of AAR Interchange Rule 32, Paragraph 10-a, the delivering company [Erie] is responsible for derailment. This responsibility also includes loose, broken, bent or missing parts causing derailment."

CENTER-SILL DAMAGE

Damage to the draft sills of a vinegar tank car owned by National Fruit Product Co., became the subject of Case 1858 when the Southern denied the NFP request for a defect card. The car arrived at Atlanta. Ga., showing what National Fruit Products claimed to be evidence that "it had a rather severe blow while in transit and the draft sill, which is the heavy steel structure running the full length of the car and to which the drawheads are attached, was buckled and bent about 4 in. from the A end of the car." The tank had shifted and braces were loosened. Concluded National Fruit Products, "The extent and nature of damage could have resulted only from careless handling on the part of the carrier or carriers involved, and the cost of repairing the car is unquestionably the liability of the carriers handling the car.'

The Southern said that there was no unfair handling covered under Rule 32 while the car was on its lines and that damage in the draft sill area is covered by Interchange Rule 44, Note C. The Arbitration Committee agreed with the contention of the Southern that "damage to center sill confined within space from end sill to rear face of body bolster is owner's responsibility, as no Rule 32 or other improper hand-

ling was involved."

Miscellaneous Publications

PHOTOMICROGRAPHY OF METALS, 46-pages. Sales Service Div., Eastman Kodak Co., Rochester 4, N.Y. 50 cents, plus 10 cents for handling. "How to" book serves as a short course in photomicrography for metallurgists interested in reviewing latest techniques in field. Includes detailed information on metallographic microscope, illumination, filters in metallography, photographic materials, exposure determination, and processing and printing. Optics of metallography discussed at length.

CNR Diesel Shops

TO THE EDITOR:

I have read with a great deal of interest and pleasure the write-up on the new diesel running maintenance shop on the CNR in the April issue of Railway Locomotives and Cars. I was quite pleased with the accuracy of reporting and the very clear manner in which you described the important features of these facilities.

I find reading this magazine most pleasant and profitable.

E. Wynne

Chief of Motive Power and Car Equipment, Canadian National

Personal Mention

Bessemer & Lake Erie. — Pittsburgh, Pa.: MAURICE R. SEIPIER appointed director organization planning. Greenville, Pa.: E. P. JAXTHEIMER appointed superintendent car department, succeeding Mr. Seipier. J. A. HANES, traveling car inspector, appointed assistant superintendent car department, succeeding Mr. Jaxtheimer. Albion, Pa.: W. D. HELLYER, district car foreman, appointed traveling car inspector. C. R. KNAPP, car foreman, appointed district car foreman, with jurisdiction over Albion Conneaut and Erie districts. R. L. Jones appointed car foreman.

Canadian Pacific. — Smith Falls, Ont.: J. McGown, division master mechanic at Revelstoke, B.C., transferred to Smith Falls division.

Chesapeake & Ohio.—Grand Rapids, Mich.: E. V. PRICE appointed shop superintendent - locomotives, succeeding H. E. FINK, retired.

Cotton Belt.—Pine Bluff, Ark.: J. Y. ALLEN, JR., car supervisor, appointed assistant mechanical superintendent - car section.

Elgin, Joliet & Eastern.—Gary, Ind.: ALFRED H. GOVERT appointed diesel supervisor, Gary division. Thomas J. Pyka appointed assistant diesel supervisor and enginehouse foreman at Kirk yard, succeeding Mr. Covert. Joliet, Ill.: EDWARD KASTL, JR., appointed enginehouse foreman, succeeding Mr. Pyka.

Frisco.—Springfield, Mo.: T. H. TEMPLE, diesel superintendent, appointed manager of planning and scheduling. J. P. KNOX, superintendent car department, appointed superintendent equipment - East. G. J. COSATT appointed superintendent equipment - West.

Jersey Central.—Elizabethport, N. J.: H. ASCOUGH appointed general foreman freight-car shop, succeeding Joseph T. Burger, retired. Mr. Ascough formerly foreman passenger equipment at Jersey City.

Louisville & Nashville.—Howell, Ind.: JOHN J. McNabb appointed to newly created position of general foreman. Formerly engineer of planning at Louisville, Ky.

Monon.—Lafayette, Ind.: V. C. GOLDEN appointed assistant general manager, retaining supervision over motive power and equipment. Formerly superintendent motive power and equipment.

New York Central. — Collinwood, Ohio.: CORNELIUS F. ROTHLAUF, assistant superintendent of shop, appointed general foreman, motive power department. New York: D. A. HEFFERNAN appointed senior lubrication inspector. Buffalo, N. Y.: WILLIAM D. TAYLOR appointed master mechanic. Formerly master mechanic at Mattoon, Ill.

Roading,—Reading, Pa.: FREDERICK J. MAY appointed superintendent of the car department, succeeding HARRY F. LYONS, deceased. FRANKLIN L. GROH, assistant su-

perintendent, appointed superintendent car shop. Joseph E. Dattner and William C. Spang appointed assistant superintendents, car department. Mr. Dattner and Mr. Spang formerly general foremen, freightcar and passenger-car shops, respectively.

Santa Fo.—Bakersfield, Cal.: W. W. LYONS appointed master mechanic, succeeding M. F. SMITH, retired. Mr. Lyons formerly master mechanic at La Junta, Colo.

Seaboard.—Richmond, Va.: H. R. BOYETTE appointed assistant to chief mechanical officer, succeeding S. J. JARRELL, retired. T. S. COOKE, Jr., appointed mechanical engineer, succeeding Mr. Boyette.

Southern.—Chattanooga, Tenn.: John E. Davis appointed general foreman car repairs. Columbia, S. C.: John F. Koontz appointed road foreman of engines.

OBITUARY

Howard B. Payne, retired general master mechanic of the Southern at Roanoke, Va., died March 23.

Supply Trade Notes

AMERICAN BRAKE SHOE CO.—Calvin E. Smith appointed district sales manager, southwest area, Railroad Products Division, Headquarters, Houston, Tex.

INGERSOLL-RAND CO. — Joseph A. Wiendl, assistant manager of sales, New York, appointed general manager of sales.

YOUNGSTOWN STEEL CAR CORP.— William F. Bartholomae, Jr., appointed manager of railroad sales, western division, at 140 S. Dearborn street, Chicago. Bartholomae formerly associated with the Union Asbestos & Rubber Co., Chicago.

DeVILBISS CO.—St. Louis factory branch moved to new building in Page Industrial Center, 1501 Fairview, St. Louis 32. New building houses area sales office, engineering and service center, and warehouse space for DeVilbiss products.

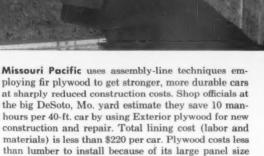
AMERICAN CAR & FOUNDRY DIVI-SION, ACF INDUSTRIES.—J. P. Gardiner appointed product manager for railway car parts. Walter H. Pogue, Ir., appointed St. Louis district representative for railway sales, succeeding Mr. Gardiner.

HYATT BEARINGS DIVISION, GEN-ERAL MOTORS CORP.—Edwin J. Klein appointed railway service engineer, Chicago and midwest territory.

PRIME MANUFACTURING CO. — William J. Botensten and Albert E. Brown appointed regional sales managers at Haddonfield, N. J., and Richmond, Va., respec-(Continued on page 100) In the shop and on the line...

You're always money ahead with Exterior plywood





and comparatively light weight.





The Milwaukee Road switched to plywood for car modernization at its Tacoma, Wash. yard, and saves up to 30% per car in relining costs. If old lining can be left in place, plywood is stapled over it. Where old lining is too damaged, it is removed and plywood applied directly to car studs. In lower photo, worn floors are resurfaced by simply applying big sheets of plywood over old floor. The system produces first-class cars that start paying their way at once.

Plywood car lining pays off in both initial construction cost and long-term operating profit. First, plywood car lining costs only half as much to install as ordinary lumber because workmen have far fewer pieces of material to handle. Plywood lining lasts longer. It's splitproof, highly impact-resistant. Pound for pound, it's stronger than steel. Maintenance is simpler, less expensive. Exterior plywood is waterproof, and can be steam-cleaned efficiently and safely. Its smooth, even surface is easy to keep in condition. Plywood lining simplifies boxcar remodeling, too. Big, lightweight panels can be installed directly over the old lining material, so the whole job is done in one step. First and last, plywood lining puts profits in your business. Clean, non-splintering, snag-free and durable, it offers top protection to valuable, high-tariff ladings.

DOUGLAS FIR PLYWOOD ASSOCIATION

TACOMA 2. WASHINGTON

-a non-profit industry organization devoted to research, promotion and quality control Always specify by DFPA grade-trademarks









Spokane, Portland and Seattle Railway switched to plywood from 2x10's for chip car sidewalls to get longer car life and to eliminate leakage. One-inch plywood is extra strong to withstand tremendous pressures exerted on car sides. Special panels, up to 41 ft. long, have tight t&g joints. Plywood's dimensional stability prevents shrinkage or cracks. Preliminary SP&S studies indicated plywood would outlast board sides and cost substantially less for maintenance.

Northern Pacific's fleet of mechanically refrigerated cars includes a number with special plastic-overlaid plywood lining to protect perishables. Lining combines plywood's strength and impact resistance with a smooth, hard, easily cleaned overlay permanently fused to its surface. Cars, made by Pacific Car & Foundry, have slatted floors to raise for cleaning, as in lower photo. Overlaid plywood lining is tough, durable, completely waterproof and will not pick up odors.

LOCOMOTIVES AND CARS WHAT'S NEW IN EQUIPMENT

Products of Exhibitors Railway Electrical and Mechanical Supply Association

(Not previously described in Railway Locomotives and Cars)



Improved Compartmentizer

Gates on the latest PS Compartmentizer can be pivoted 360 deg and swung outside of the doorway to facilitate palletized lading or use of fork trucks. They can be moved from car end to car end because the floor and ceiling keepers extend the full length of car, or moved across and locked in doorway area without special bars or extra load bracing. Three-pronged locking bars permit locking at 1½-in. increments. An automatic spring loaded safety catch prevents unlocked gates from swinging and damage. The first train movement swings gate toward wall and engages the floor lock. Floor and ceiling locking give cars smooth, flush side linings.

The Compartmentizer can be adapted to refrigerator cars, straight or insulated box cars in normal service having door openings ranging from 6 to 15 ft. Approximate weight per set of four, complete and installed in a PS-1 40-ft 6-in. car is 6,900 lb; in a 50-ft 6-in. car, 7,400 lb. Pullman-Standard, division of Pullman Inc., Dept. RLC, 200 S. Michigan ave, Chicago 4.

Integral Support Bearing and Dust Guard

The Kalny type bearing for the commutator position combines into a single unit the functions of the separate traction motor axle support bearing and the dust guard. The outside diameter of the commutator end collar of the support bearing is increased, and the collar's end surface has an annular recess which holds a felt seal. To-

gether, these features produce a dust guard

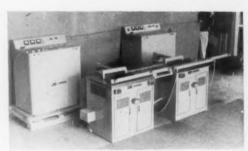
integral with the bearing.

It is claimed that the design eliminates loose dust guards and prevents the mechanical damage which now results from relative motion between the bearing and dust guard during wheel "hop." Because a more completely sealed unit is produced, support bearing life is increased and lubrication is improved. Installation can be completed faster and more economically. Magnus Metal Corp., Dept. RLC, 111 Broadway, New York 6.

Reefer Unit

A high-capacity mechanical refrigeration assembly, using separate motor and compressor for refrigerator cars, is designed to operate between -10 deg and 70 deg F. Its 5F40 compressor, which automatically starts unloaded, is driven by a 15-hp electric motor which provides fast pull-downs. When installing or servicing, quick-discon-

nect, self-sealing couplings eliminate dehydrating before restarting the system. A centrifugal fan with backward curved blades guards against over-loading the evaporator fan motor. New prismatic sight glasses permit the liquid level in the receiver to be checked at a glance. Carrier Corp., Dept. RLC, Carrier Parkway, Syracuse 1, N.Y.



Ultrasonic unit



Turbolator

Ultrasonic and Agitator Cleaning Equipment

The Magnopak transducer built into each Turco ultrasonic cleaner permits equipment to be designed for almost any cleaning requirement. The cleaners can be used for very high temperatures and can be engineered for cleaning large components. They operate at 20 kilocycles, and are suitable for cleaning AB valves and other miscellaneous parts.

The Magnopak transducer is a refined version of the magnetostrictive type transducer. At equal electrical output levels it provides twice the ultrasonic power of any other magnetostrictive transducer and can be driven to power intensities three to four times those of the piezoelectric type.

An ultrasonic cleaning unit is comprised of three principal parts—a generator, which produces high-frequency electrical energy;

a transducer, which changes the electrical impulses into high frequency sound waves that vibrate, and a cleaning tank, which contains the required cleaning agent. The scrubbing action of the solution is accomplished through cavitation.

The Turco Turbulator (agitated cleaning) tank features four-flow action for washing, degreasing, and decarbonizing injectors, connecting rods, cylinder liners, rocker arms, etc. The tanks are available in seven standard sizes for cube baskets and seven standard sizes for rectangular baskets. The square tanks have two propellers facing each other on opposite walls. The rectangular tanks have four propellers in sets of two, similarly facing. Turco Products, Inc., Dept. RLC, P.O. Box 1055, Wilmington, Calif.



These switchers were death on brushes'til the road tried ATIONAL



M. HENIKA

PROBLEM: Road switching locomotives broke hundreds of brushes per month because of severe vibration.

RECOMMENDATION: "National" Brush Grade DE-3.

RESULTS: Not one report of brush breakage in the following twelve months.



Contact your "National" Brush Man

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UNION CARBIDE

WHAT'S NEW IN EQUIPMENT—(Continued from page 18)



"Bag molding" for commutator coils



Vacuum pressure system for armateurs

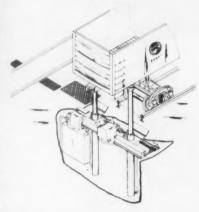
Rewinding Traction Motors

A complete, balanced improvement of the two major factors affecting motor life—vibration and moisture—is the objective of the new G. E. methods of rewinding and rebuilding traction motors being used in its locomotive repair service shops throughout the country. The methods include contour molding motor parts with epoxy resin by two new methods: "bag molding" for commutating coils and a vacuum-pressure system for the armature.

The pressure molding process inhibits the formation of voids in the system and controls the thickness and contour of the insulation. The process is one in which the resin is cured while being held under pressure. The finished coil has good dimensional tolerances which assure good heat transfer and freedom from chaffing due to vibration.

The armature treatment involves several cycles of alternating vacuum and pressure to fill all voids and crevices in the winding

structure. Core laminations, coils, spacers, wedges and bands become one tight assembly, with improved heat transfer and maximum mechanical strength. Then the whole armature is transferred to a turning fixture and backed in a curing oven. Locomotive and Car Equipment Dept., Co., Dept. RLC, Schenectady, N. Y.



Spot-Repair Jacks

Hydraulic power for all jacks in the one- to four-track R.M.C. spot car repair system is now supplied from a single pumping system. The jacks may be fixed position for raising cars from trucks or traversing for various width cars, and for additional use as truck-side-frame jacks for axle-bearing repairs. Previously, individual jacks at each track required separate pumping systems.

In the spot car repair system, mechanical "rabbits," controlled from a centralized switchboard on each track, bring cars to be repaired to a pneumatic car stopper where they are positioned for jacking. Hydraulic jacks, also controlled from the central switchboard, then raise the cars for truck repairs and other maintenance work. Cars are jacked in 20 to 30 sec. Interlocking of controls at central switchboard provides blue flag and derail protection against car movement either by locomotives or pullers. Hydraulic jacks have safety locks. Railway Maintenance Corp., Dept. RLC, Box 1888, Pittsburgh 30.

Adapter Assembly For Refueling System

The SA12197-1C adapter assembly incorporates a spring-loaded poppet type check valve. The valve is open only during the fueling operation. At other times, it is closed, sealing the locomotive fuel tank and preventing the escape of vapors or the loss of fuel should the locomotive filler cap be lost



Adapter



Nozzle

Automatic nozzles—1½-in. No. 12194P and 2-in. No. 12190P—for use with the check valve adapter have internal brass probes which actuate the check valve in the locomotive adapter. The probe holds the check valve open after the nozzle shuts off, allowing the fuel oil to drain into the tank.

An automatic shut-off nozzle to handle flows to 300 gpm is under development. Buckeye Iron & Brass Works, Dept. RLC, P. O. Box 883, Dayton, Ohio.



Storage Batteries

The Edison Dynaclad battery is a leadacid battery for diesel engine starting. Its tubular positive plate is constructed of highstrength interwoven modacrylic fiber tubes

(Continued on page 91)

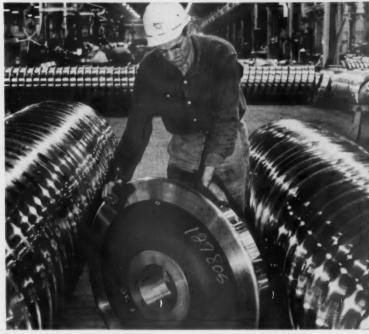
Why Armco wheels are forged and rolled

There's more than a half-century of wheelmaking and steelmaking know-how behind every Armco Wrought Steel Wheel you buy. And today, even though Armco Wheels are manufactured with the most modern and efficient equipment in existence, two basic things remain unchanged.

Every Armco Wheel is forged and rolled to assure toughness, low maintenance and long life.







NEW FREE CATALOG

Fill in and mail the coupon. It will bring you a copy of Armco's new wheel catalog. A major section of this catalog contains data never before assembled on factors that influence service life of wrought steel wheels. It's a useful addition to any Engineering, Operating, Purchasing, or Mechanical Division library.

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ARMCO STEEL 1880 Curtis Stre	CORPORATION let, Middletown, Ohio
	"Armco Wrought Steel Wheels."
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EDITORIALS

Men with Ability and Vision

In equipment and methods many people accuse the railroads of being laggards in comparison to other industries. If there is any justification in this accusation it is not because the railroads' mechanical and electrical department men are living in the past. They have the ability to design, build and maintain locomotives and cars as up-todate as any equipment found in the plants of other industries. They also have the vision needed to accept new ideas and advanced designs originated by the railroad supply industry.

There is no question about the railroads' need for new equipment and facilities. But the main deterrents are of a financial and personnel nature, not those involving technical know-how. With freight cars, of course, there are also the complexities raised by our operating characteristics that demand conformity to interchange requirements.

Given the money and no regulatory conditions, except those relating to safety, the mechanical and electrical departments can move fast. The swift switch in motive power from steam to diesel is an outstanding example. Eight years ago, when the AAR Mechanical Division met at San Francisco there were 13,455 diesel locomotives (19,082 units) and 18,489 steam locomotives in the United States. Today, there are 28,293 diesel units and only 77 serviceable steam locomotives not stored, as of April 1, 1960. The purchase of this new power and the retirement of old was only a part of the big job facing mechanical and electrical officers when this changeover was made. They had to train the men and build the shops and terminals that are of primary importance in keeping this new power ready when and where the operating departments need it. That this change was made so smoothly is a tribute to their ability to meet the challenge of today's traffic needs.

Even under the handicaps imposed by necessary interchange requirements the past eight years has also seen relatively fast changes in rolling stock. All have been made with the objective of supplying service demanded by present customers and the kind of service needed to recapture traffic lost to other forms of transportation. Foremost on the list are the piggyback, container and auto-carrier cars that have played a key role in getting "box cars" off the highways and back on the rails. This tailoring of rolling stock to satisfy the phenomonal acceptance of piggyback service is not unique. There has been an upsurge in building all kinds of special cars for specific purposes.

There are cars with load-retaining and shock-absorbing equipment, cars with wide doors and plug doors and cars with roll-up sides. There are wood-chip and coilsteel cars, covered hoppers with high-speed unloading devices for bulk commodities, high-capacity tank cars, and even stock cars in which a pig would be comfortable on a cross-the-nation journey. And the mechanical re-

frigerator car that started out to satisfy the frozen-food traffic requirements has become extremely popular with the fresh fruit and vegetable trade.

The record would not be complete without mention of the "hot box" situation. It was the No. 1 problem in 1952. It is still at the top of the list. But in no comparable period in the railroads' history has so much been done toward getting it downgraded to the No. 2 spot. With journal lubricators, journal stops, new plain bearing designs, improved lubrication and detection devices, and with roller bearings, significant progress has been and is being made.

These are only some of the accomplishments of the past eight years. They are not reviewed here for the purpose of making mechanical and electrical department men feel smug about their record of the last eight years. They are offered as being indicative of the progress that can be made by these departments in developing the equipment that makes customers want to ship by rail.

End of the Beginning

Movement of Burlington's Pioneer Zephyr to Chicago for permanent display at the Museum of Science and Industry during May saw a real diesel pioneer receive the reward it so well deserves. Here was the train and power plant which in 1934 showed the ability and reliability of diesel power in long distance service. The equipment of this train sparked the revolution in speed and comfort which revitalized American passenger service throughout the 1930's

The original Jersey Central diesel switcher, placed in service in 1925, and the Baltimore & Ohio's first road passenger diesel, built in 1936, had previously been preserved. It is appropriate that the 1934 Pioneer Zephyr should be honored in the same way.

That Zephyr's dawn-to-dusk, non-stop run from Denver to Chicago's Century of Progress showed U. S. railroaders that the diesel engine was more than a prime mover which could offer exceptional savings in low load factor switching service. The diesel was shown to be an engine which could operate under full load for extended periods—and could do it reliably enough to be assigned to the fastest and fanciest of trains.

Retirement of this Zephyr leaves in service still another diesel veteran—the original General Motors road freight locomotive built in 1939. The four units of this locomotive have been operated by the Southern since 1941. It would be appropriate, when the time comes for retirement of this Southern locomotive, that some or all of its units could be preserved. When this demonstrator had finished its 1940 freight runs, the diesel revolution was under way on every front. The passage of twenty years has seen the diesel come out on top in every case.



AIRFIL COATING OIL DELIVERS TOP-NOTCH AIR FILTRATION-5 WAYS

See above, how well a coating of Airfil traps dirt in cab filters after 15 days of service. The outside surface of the filter at right is blackened by trapped dirt. The engine side of a similar filter, left, is clean!

Airfil gives 5 superior filtering qualities:

- Wicks rapidly through trapped dirt to trap more.
- Gels in place on filter doesn't drip in service.

- Resists removal by rain or car washing.
- Cleans off easily with steam or hot detergent.
- · Allows good air flow.

We believe you'll find Airfil unmatched for filtering out airborne dirt. For more information on the complete line of Esso railroad products, or expert technical assistance, write: Esso Standard, Division of Humble Oil & Refining Company, 15 West 51st Street, New York 19, New York.



RAILROAD PRODUCTS

In Industry after Industry..."ESSO RESEARCH works wonders with oil"

cut
car building
and
repair
costs

SWi

CP cold riveters

Both car builders and railroad shops can "cash-in" on the production economies obtainable with Chicago Pneumatic Cold Riveting Equipment.

CP Cold Riveters not only help increase car output... they help cut production costs as well. Their handling ease, large tonnage capacity and accurate pressure control make operation fast and simple. And there are no





"Carline" unit clamps roof members firmly...then drives cold rivets cleanly.

lost manhours due to heating and "bucking-up". Sections can be stationed with fewer drift pins... operator quickly pre-loads cold rivets by hand.

Compact CP Hydraulic Riveting Equipment is available in stationary or portable models for driving cold rivets up to 34". For full details, write: Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.

Chicago Pneumatic

PNEUMATIC AND ELECTRIC TOOLS . SPEED RECORDERS AND INDICATORS . PORTABLE AND STATIONARY AIR COMPRESSORS . HYDRAULIC RIVETERS

JUNE • 1960



Newest builder of domestic road diesels, General Electric, now offers this 130-ton unit. Other U.S. locomotive builders all have 2,400-hp locomotives.

Newest Contender for U. S. Market . . .

U25B: GE 2,500-hp Road Switcher

On April 26, General Electric's Chairman, Ralph J. Cordiner, announced GE's decision to add the 2,500-hp diesel-electric unit to its domestic line. Two of these high-horse-power road-switchers have been under test on the Erie Railroad since early 1959. They have also made demonstration runs on the Pennsylvania and the Southern.

Designated the U25B and built at GE's Erie, Pa. plant, the unit is a four-axle locomotive designed for high-speed operation. GE engineers point out that the 650 hp per axle is well under the more than 700 hp per axle delivered through the same GE 752 traction motor in the GE-built 8,500-hp Union Pacific gas turbine locomotives. The main objective in building this unit, they said, was to produce more horsepower with less machinery.

The power plant is a 16-cylinder four-cycle, turbocharged engine with 9½ in. by 10½ in. cylinders in a 45-

deg Vee arrangement. It is built to GE's specification by Cooper-Bessemer at Grove City, Pa. with GE taking complete responsibility for the entire locomotive. General Electric has developed maintenance tools for the engine and will train men to service and maintain this power unit.

The engine has an integral head and cylinder arrangement which can be pulled in 15 min. according to GE. It is equipped with cast-iron-pistons, valve seat inserts and the Bendix fuel system. The cylinder liner is chrome plated and 3/16 in. thick. Because of this thin liner it is claimed that the cylinder walls run cooler due to better heat transfer.

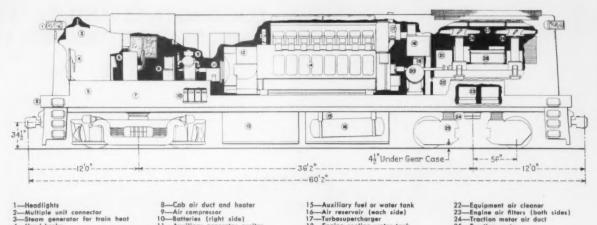
The engine governor is the electrohydraulic type, automatically regulating horsepower output at each throttle setting. The engine is automatically shut down if its speed exceeds maximum rated rpm by 10 per cent.

Radiators are roof mounted at the

rear of the engine cab with fans directly driven by shaft and gearing from the engine. Water temperature is thermostatically controlled through by-passing all or part of the cooling water around the radiators. There are no shutters and no electrical controls. The builder claims that, while there may be a very slight increase in fuel cost because the fans operate continuously, this disadvantage is more than offset by the decrease in maintenance obtained by elimination of the variable speed control.

Pressurized filtered air is delivered to the operator's cab, engine cab, electrical machines, and the control equipment. A self-cleaning static air cleaner operates at nearly 100% efficiency for all particles over eight microns. Exclusion of dirt is expected to increase reliability of apparatus and to reduce cleaning costs. Engine air is also cleaned through oil bath filters.

The locomotive has the GE single-



-Headlights

-Multiple unit connector -Steam generator for train heat

4-Hand brake

-Control compartment (left side)

-Operating controls -Air-brake equipment (right side)

-Cab air duct and heater

-Air compressor -Batteries (right side)

Auxiliary generator excitor

2-Traction generator

General Electric classifies short hood of this road switcher as the front

end, and cab controls are placed accordingly. The two units, after com-

pletion in 1959, operated for several months on the Erie while details of

the design were under study and test. Prior to formal announcement of

14-Diesel engine

15—Auxiliary fuel or water tank 16—Air reservoir (each side) 17—Turbosupercharger

-Engine cooling water tank

9-Lube-oil coole

21-Dynamic braking equipment

the marketing of the U25B locomotives in the U.S., these two demonstrators also made runs on the Pennsylvania and Southern. During all these operations, General Electric studied the slip-suppressing brake (RL&C, May 1960, page 32).

end, multiple-unit control. Control devices are grouped in a pressurized compartment. Reverser and line contactors are electro-pneumatic; other contractors are magnetically operated. Circuit breaker type switches are used in control circuits where over-current protection is required.

The electrical control compartments are located on one side of the locomotive below the operating cab. They are easily accessible from the ground or a platform but difficult to tamper with when the locomotive is in motion. All piping and wiring are under the running boards; piping is on one side, wiring on the other.

Because of its high capacity, the GT 598 generator permits a simplification of controls and a reduction in the number of contactors. The locomotive is equipped with only four rotating machines, other than the traction motors. These are the main generator, exciter, fuel pump, and battery-charging generator. There are no belts on the unit.

GE's adhesion loss detection system with an alternator on each axle automatically signals when wheels are slipping. Correction is automatic through a fast-acting, slip-suppression brake. Manual slip control is also furnished.

A new mounting of the controller in the operating cab adds more room in this limited space. The throttle has 16 notches instead of the usual eight for more selective power control. The sides, roof and floor of the cab are insulated

Nothing is mounted over the engine

On Our Cover

Pennsylvania was using two U25B demonstrators for runs between Harrisburg and Chicago when the photograph was taken in mid-May.

and generator, permitting easy access to this space through hinged engine hatches. Detachable roof sections permit removal of equipment.

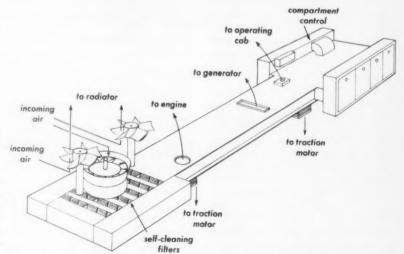
A welded underframe of low alloy steel is used with cast-steel bolster and draft gear housing. Running gear consists of two side-equalized, swing-motion trucks with 40-in. wheels and 6-1/2 in. by 12 in. roller bearings.

Truck frame, bolster, and spring plank are cast steel. The truck frame is supported by two equalizers on each side with coil springs between each equalizer and the frame.

25—Traction motor 26—Radiator fans

Air brakes are Schedule 26L. A hand brake is located in the front compartment. Fuel capacity is 1,700 gal. with 1,200 gal additional tank volume available if a steam generator is not required. The locomotive carries 275 gal of lubricating oil, 220 gal of cooling water and 32 cu. ft. of sand.

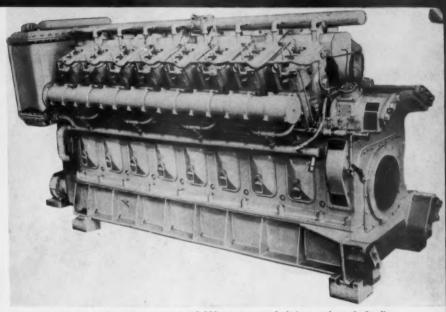
The maximum tractive effort is 81,-000 lb. Gear ratios of 74:18; 65:18; 64:19 and 62:21 give maximum permissable speeds of 65, 75, 80 and 92 mph respectively.



Ventilating air for everything except radiators and dynamic brake grids goes through self-cleaning filters and then through extensive duct system built into locomotive underframe.



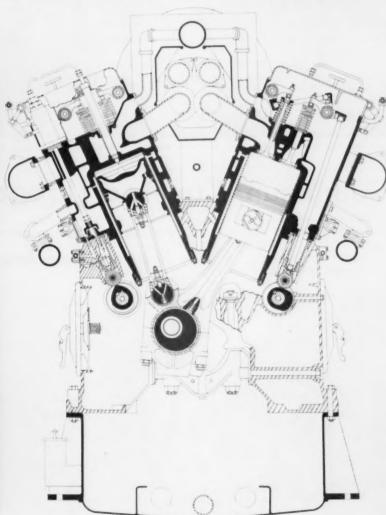
Piston is exposed for inspection by removing liner and head assembly. Cylinder has 9-in. bore and 10-in. stroke. Rod is articulated.



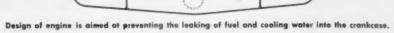
Sixteen-cylinder, four-cycle engine operates at 1,000-rpm top speed. It is supercharged. Smaller Type F engines have been supplied since 1946, but 2,500-hp model is recent development.



Traction controls are all pressurized and are mounted outside and below the operator's cab.



Throttle and brake are convenient for operator. Short hood is rated as front of unit.

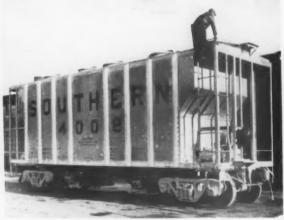




Aluminum body and steel center sill and bolsters become evident when car is rotated in jig so the welding of the body members can be completed.

Aluminum Covered Hoppers In Service

Southern has received all its 100 tonners; 75 of them are largest LO cars ever built



Twin-hopper, two-compartment cars of 2,600 cu ft capacity were turned out first when Magor began production of this large order.



Triple-hopper cars were among 455 covered hoppers which made up second largest order for aluminum freight cars ever placed in the U.S.

The 455 aluminum-alloy covered hopper cars which Magor Car Corporation has just completed for the Southern are of three different sizes. Already they are at work moving a series of different commodities. The 200 twinhopper (two-compartment) cars have been built to handle cement. The 180 triple-hopper (three-compartment) cars are to handle alumina and similar materials. The 75 quadruple-hopper (four-compartment) cars are for coating clays, feeds and grain. The cars are part of an order placed last July (RL&C, Aug., p 10) and, together with the 35 steel covered hoppers for bulk lime also ordered from Magor at that time, have cost approximately \$10,309,000.

While the twin-hopper cars with their 2,600 cu ft capacity are of conventional size, the triple-hopper models have a capacity of 3,818 cu ft, which ranks them with the largest covered hoppers previously built. The 4,713 cu ft capacity of the quadruple models makes these the largest conventional covered hoppers (AAR Class LO) in existence.

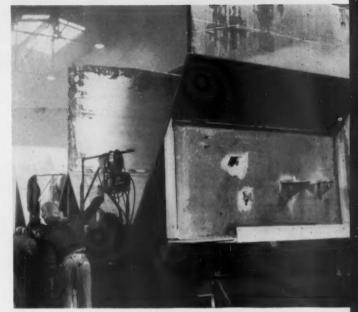
Aluminum Raises Pay Load

Utilization of aluminum alloys in the bodies of these cars has made possible unusually high pay loads. All have two-axle, 90-ton trucks, which allows an on-the-rail weight of 251,000 lb for each of the cars. The trucks have $2\frac{1}{2}$ -in. travel springs, $6\frac{1}{2}$ - x 12-in. roller bearings, D-6-D axles with modified $7\frac{3}{8}$ -in. diameter center portion, and 36-in. multiple-wear wheels.

Car bodies are of conventional design, with variations made possible or necessary because of the use of aluminum in their construction. The light weights and load limits are:

	Capacity, cu ft	Light weight, lb	Load limit, lb
Twin	2,600	43,600	207,400
Triple	3,818	50,100	200,900
Ouadruple .	4.713	57,500	193,500

Because of the low light weight and the high capacity, it has been necessary to use empty-load brakes. All cars are equipped with Schedule ABEL 10-10 brake equipment, which includes automatic changeover between empty and loaded positions. The trucks have single-shoe brakes and the No. 36 Unit brake beams.



Floors and hoppers are fabricated from $\frac{1}{2}$ -in, aluminum alloy plate. Magor used semi-automatic welding processes wherever possible.

All three types of cars have steel center sills formed of 51.2 lb AAR Z-sections. The sill is reinforced with steel angles riveted along the inner sides of the two webs. Body bolsters are built up of steel and aluminum plates and shapes. Above the aluminum top cover plates on these bolsters, the body of the car is composed almost entirely of aluminum-alloy plates, extrusions and castings. Only steel components on the body are the cast Enterprise hopper openings, the shaker brackets riveted to aluminum pads on the outsides of the hoppers, the air brake equipment, and the stainless hinge pins and latches used on the roof hatches.

Aluminum used in each of three types of cars has been: twin, 11,730 lb.; triple, 15,700 lb, and quadruple, 20,270 lb. Side angles, side plates, side posts and carlines are extrusions designed and produced especially for these cars. Other aluminum structural members are formed from standard angles, Tee sections and H-beams. Floors, hop-



These 4,713 cu ft covered hopper cars, the largest ever built, will be hauling feeds and grains. Reynolds Metals, supplier of the aluminum

plates and shapes, worked with the Southern and Magor in the design of the three types of cars which were involved in these deliveries.



Aluminum car production was fitted into Magor's assembly procedures.

pers, and bolster top cover plates are formed of ½-in. and thinner plates; side and intermediate partitions are 5/16-in. plate, and roof sheets are 3/16-in. plate. Aluminum alloy used in the cars is a magnesium stabilized material. It is known as alloy 5083 and contains 4.5 per cent magnesium. The frames of the roof hatches are cast of aluminum alloy 356.

The arrangements of the three types of cars are similar. The twin and triple hoppers have the same overall width and height. The 60-ft length of the quadruple hoppers made it necessary to reduce the width of the car to 10 ft 3½ in. The other two models are 10 ft 6¾ in. wide. Slope of the floors in all the cars is 50 deg.

Magor fabricated all the body material, with the exception of the shaker brackets, hopper openings, roof hatch frames, and the aluminum brake steps and running boards.

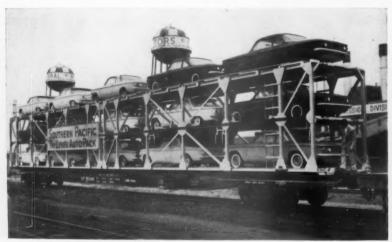
Larger aluminum sections and sheets were sheared and smaller material was sawed in the wood shop. All of the forming was done by cold working. Assembly of these cars represents what was probably one of the largest production lines ever established for working with structural aluminum. Basically, the cars are welded, with riveting used at certain points, such as the aluminum-to-steel connections.

Aluminum welding is done by the metal inert gas (MIG) process, using argon for shielding. Practically all welding was done downhand, with the exception of some tacking of roof sheets which was done overhead. As a preparation for welding, the edges of plates and sections were cleaned with Oakite 33 and stainless-steel wire brushes. Welding wire varied in diameter from 1/32 to 3/32 in. Because of the variety of subassemblies and the three sizes of cars, it was considered impractical to set up elaborate automatic welding jigs. After welding, all welded joints at carlines, side plates, and hatch covers on the interior of the car were given a coat of zinc chromate primer, except on those cars designated to handle foodstuffs. On the exteriors, joints forming ledges which could hold water were caulked.

Riveted joints between steel and aluminum were carefully prepared with the aim of excluding moisture during subsequent service. Such contact areas were initially given coats of lead-free zinc chromate. After this primer dried, a heavy coat of non-skinning, semi-plastic caulking compound was applied. Upon completion of riveting, the excess compound was wiped away or formed into fillets. These steel-to-aluminum joints, which were hot riveted, included the bolster-to-body connections, and the floor sheet gussets and end sills which were fastened to the steel center sill.

Only structural riveting in the body was riveting of the bolster side posts to the side sheets. This joint was prepared with zinc chromate and fastened with 5%-in. Huckbolts. Running boards were applied with cold-squeezed aluminum rivets to the brackets welded to the car roof. Safety appliances were applied with aluminized steel bolts and lock nuts.

'Auto-Pack' Developed for Southern Pacific



Southern Pacific joins Frisco and Santa Fe in three-level automobile transport. Other two roads have cars permanently fitted as triple deckers (RL&C, March 1960, page 28).

Removable, three-deck frame which converts a conventional 85-ft piggy-back car for three-high automobile transport has been delivered to the Southern Pacific by Whitehead & Kales. Device will handle 12 standard autos or 15 compacts.

The device can be installed on a General American R-85 or G-85 piggy-back car in about 20 min. It rests on the car center sill and rides on rollers built into the device at the frame uprights. Overall height of the loaded car when carrying this Auto-Pack ranges up to 18 ft 6 in. Light weight of the car with it is 99,600 lb. When not needed for auto movements, the three-high frame can be removed and the car continued in container or trailer service.

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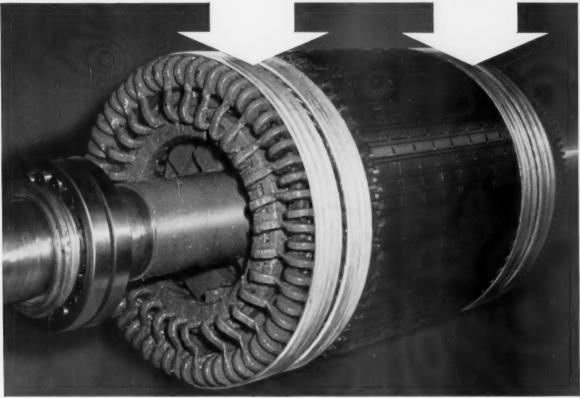


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The application of COBRA SHOES to its piggyback cars is but the latest indication of the Canadian Pacific's adoption

of this improved brake shoe. Following its first order in May, 1956, and its successful use on an overnight compartment car on the Montreal-Toronto run, the Canadian Pacific has installed COBRA SHOES on 48 commuter cars, 22 transcontinental sleepers, *363 piggybacks, and on *150 diesel switcher and road locomotives.

COBRA SHOE installations are growing in expanding number and volume. Like the Canadian Pacific more and more railroads turn to COBRA SHOES as service evaluations repeatedly demonstrate their smoother performance and their economy through greatly extended service life.

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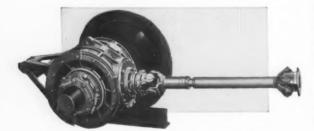
RAILROAD FRICTION PRODUCTS CORPORATION Wilmerding, Pennsylvania

Spicer Model 8 is "the only drive that will do the job" for Budd



Favored the world over for their ability to reduce costs and improve service, Budd self-propelled Rail Diesel Cars are 100% equipped with Spicer Axle Drives. Budd says, "We use Spicer Model 8 drives exclusively, simply because they're the only type on the market that will do the job."

That job is to transmit power from the diesel



engines to the wheels, and is accomplished by a pair of Spicer drives which are mounted directly to the axles.

Especially designed for this type of service, Spicer Model 8 drives are self-contained units employing spiral bevel gears and anti-friction bearings which are constantly running in a bath of oil. No adjustments are necessary since the gears are matched and aligned at the factory . . . after which they are lapped-in, checked and sealed for absolute protection against ballast, dirt, snow, water, and sleet. As a result, Spicer Model 8 drives have a service expectancy of 1,000,000 miles before a major overhaul.

For the maximum in high efficiency, economy, safety and quiet operation, specify Spicer . . . a mark of quality found on over 14,000 railway positive gear drives.



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ENGINES AND HYDRAULIC TRANS-MISSIONS for the six 4,000-hp, single-cab A-unit diesels to be completed later this year in Germany for the Denver & Rio Grande Western and the Southern Pacific will not be manufactured by Krauss-Maffei, the builder of the locomotives (RL&C, March 1960, p. 24). Instead, K-M will be utilizing the latest products of two other German machinery manufacturers—Maybach and Voith.

While high-speed diesel engines and high-capacity hydraulic transmissions have been used in Europe for many years, the 2,000-hp Maybach diesel and the 2,000-hp Voith hydraulic transmission have only recently been introduced. Both set new records with respect to their power ratings. With only a single exception, the largest locomotive transmission previously supplied by Voith was rated at 1,100 hp. The 16-cylinder Maybach engine to be used is an enlarged version of the 12-cylinder, 1,500-hp engine which is now in locomotive service in a number of European countries.

The SP and the D&RGW are not alone in ordering locomotives to be powered with high power equipment. The German Federal Railways and the British Railways are taking delivery of single-engine, B-B locomotives equipped with the 2,000-hp Maybach diesel.

The ten German V.160 locomotives with the Maybach engines are also getting the Voith L.218rs transmission. The SP and D&RGW locomotives will be the first in which two of these engines and two 2,000-hp transmissions have been installed in a single unit. The result will be the highest horsepower ratings ever possible with single-unit diesel locomotives.

The Maybach MD870 is a supercharged, four-cycle, 16-cylinder engine with a 2,000-bhp rating at 1,500 rpm, the top engine speed.

This 60-dg V-type engine has all the established details of the Maybach MD, including the short and rigid tunnel crankcase, large-diameter roller main bearings around the crank webs, and fork-and-blade connecting rods. Features of the power assemblies are two-piece pistons, separate piston cooling oil system, integral pump injectors, and spherical precombustion chambers.

Cylinders have a 7.3-in. bore and 7.9-in. stroke. The rating of 2,000 bhp involves a brake mean effective pressure of 198 psi and a piston speed of 1,970 ft per min. Weight of this engine, complete with superchargers, aftercoolers, and auxiliaries, is 13,200 lb, or 6.6 lb per bhp.

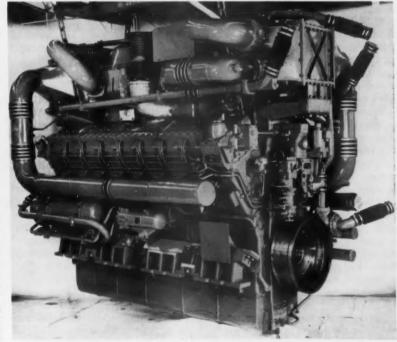
Specific fuel consumption is 0.380 lb per bhp-hr, and lubricating-oil consumption is 6.6 to 8.8 lb per hr.

Compression ratio is 15 to 1, and the injectors are set to open at 1,850 psi. Firing order for each cylinder bank is 1, 6, 2, 5, 8, 3, 7. Crankcase and cylinder blocks are formed as an integral unit, below which is a sheetmetal oil sump which has a capacity of 63 gal. The blocks are surmounted by individual cast-iron cylinder heads, each having three inlet and three exhaust valves arranged around the pre-

combustion chamber. These six valves make it possible to provide a strong and well-cooled base for the burner in the opening of the spherical precombustion chamber. From the precombustion chamber, the gas expands into the combustion chamber through the six holes of the burner, or distributor, which is made of heat-resisting steel, and screwed into the cylinder head.

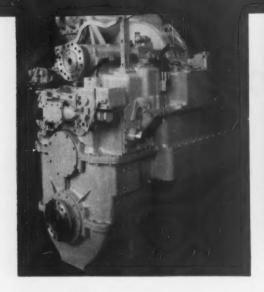
There are two camshafts for each cylinder bank—one for the exhaust valves and the other for the intake valves. Camshafts are carried in plain bearings supported not on the cylinder heads, but in a camshaft housing in which the camshaft-bearing supports are cast. Camshaft drive is through a gear train in the timing case at the back end of the engine. Hydraulic lash adjusters are incorporated in the rockers.

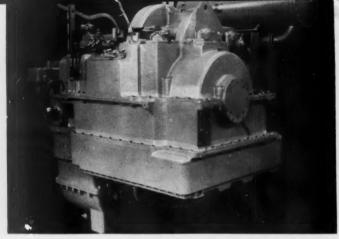
The two-piece pistons make possible easy ring inspection. This can be done without separating the connecting rod from the piston, or the rod from the crankshaft. The steel crown is also the ring carrier and is secured to the machined top of the light-alloy



Maybach MD870 engine has all of its super-charging equipment mounted on top of it.

Technical information in this article is based on an article appearing in the March 1960 issue of Diesel Railway Traction and abstracted with the permission of Tothill Press, Ltd., London, England.





Hydraulic transmission rated at about 2,000 hp and known as the L 218rs has been delivered for German locomotives. Another Voith design, probably incorporating dynamic braking, will be supplied for units to be built for U.S.

piston by bolts. When these bolts are taken out, the crown and rings can be lifted out. Pistons and crowns are cooled by a separate cooling-oil circuit, with pressure varying according to the engine speed.

A piston carries three pressure rings and two slotted oil-control rings. The eight-throw disc-webbed crankshaft is a single forging, with eccentric hollowboring of the pins. To the free end is studded a vibration damper. At the back end there is a pressed-on driving flange. Reinforced caps are fitted to the big ends of both the fork and blade rods. Of the cylinder center-to-center distance on the crankshaft, 51 per cent is taken up by the rod bearings and 21 per cent by the roller main bearing. Beneficial characteristics of this large bearing area are supplemented by the rigidity of engine structure and crankshaft produced by the tunnel crankcase and large-diameter roller main bearings.

Between the cylinder banks are mounted two vertical-shaft superchargers. Each is connected to a separate aftercooler which is carried on a cantilever bracket at the end of the engine. In the center of the engine. between the superchargers, are vertical exhaust ducts leading to the locomotive roof. Length and the volume of the exhaust ducts are made as small as possible by Maybach, permitting the vertical arrangement of the turbine shafts. For the same reason, two turbochargers have been used because a single charger would require long exhaust ducts.

Arranging the superchargers in the middle of the engine minimizes overall length. The crankcase is only 83½

in. long. Each charger group has a water-cooled turbine in the lower portion, with the compressor above it. Casings of these two are bolted together, but there is an intermediate inlet casing between the turbine casing and the engine which carries the lower roller bearing. The upper ball and roller bearing is housed in the blower casing. At 1,500 rpm engine speed, the supercharger operates at approximately 12,500 rpm.

Engine auxiliaries include a water pump and two heat exchangers—one for the lubricating oil and one for the piston cooling oil. These are connected to the engine cooling-water circuit along with the heat exchanger for the torque converter fluid from the hydraulic transmission. The cooling circuit from the aftercooler is separate.

Voith Transmission

This latest Voith transmission, the L.218rs, consists of two torque converters and one fluid coupling, with automatic emptying and filling of the fluid circuits. Use of a fluid coupling as the third stage gives high efficiency at top track speeds.

The standard model has two output flanges from the final gears at the bottom, from which cardan shafts can be taken backwards and forwards to two truck drives. The reversing gears are immediafely after the hydraulic portion and before the final reduction gears for the two output shafts. The reduction gears can be set for a high-speed range or low-speed range. All this gearing is placed at the same end of the transmission and just below the input shaft from the engine.

These gears are separate from the

hydraulic portion, making all wearing parts, such as dog clutches, gears and bearings easier to reach and service.

Transmission control depends on engine output and track speed. They are combined by a small spring-loaded centrifugal governor which controls hydraulic circuits that position pistons to regulate the filling and emptying of the torque converters. The engine throttle is linked with the transmission control so that when it is moved from idle, the transmission is cut in. The engineman has only a single throttle lever to operate with the transmission sequence being automatically controlled.

Reverse gears and alternate-speed gears can be operated only with the locomotive at a standstill. Control equipment, such as the governor, solenoid, changeover valve, and filter, are all grouped on one side of the transmission casing and are readily accessible.

The two torque converters, starting and running, produce approximately a parabolic tractive effort curve up to about 80 per cent of the top track speed in each speed range. The German V.160 locomotive, with 87 mph top speed, has a torque converter in circuit up to about 70 mph, after which the drive is through the coupling and without torque conversion. By overlapping the emptying and filling of the two torque converters, fluctuation of tractive effort during changeover from one converter to the other is avoided.

It is reported that the Voith transmissions for the SP and D&RGW lococomotives will incorporate a form of dynamic braking.



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"Excelloy"—a remarkable Pedrick-developed piston ring alloy—is specifically designed to put "muscle" in top groove rings and end the problem of breakage. Twice as strong as regular piston ring iron, "Excelloy" has a dense, uniform structure that combines toughness and resiliency with a very high tensile strength and resistance to heat. In addition, Pedrick "Excelloy" Rings have an extra-heavy chrome facing, for most installations, to provide up to four times longer ring life.

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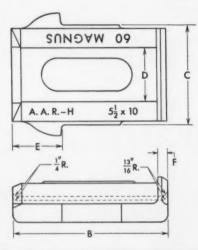


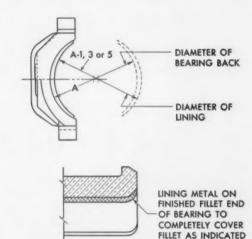
New raised back bearing design improves load distribution, reduces lateral play, balances thrust loads and reduces wiping at both fillets—promises a new high in solid bearing performance and economy In the New AAR standard bearing design, there are a number of important changes which will improve overall performances on both new and old cars. The principal design changes and their advantages are as follows.

A new raised seat pad on the bearing back gives controlled radial load distribution—puts preferential loading in the middle of the journal where lubrication is more abundant and uniform at all times. This lowers operating temperatures, builds up bearing miles.

Magnus Solid Bearings

NEW A. A. R. STANDARD JOURNAL BEARINGS





CLASS	SIZE JOURNAL	DIMENSIONS IN INCHES														
		A	Std.	Step Sizes		Std.	Step Sizes		С	D	Std.	Step Sizes		Std.	Step Sizes	
				A-3	A-5	B-1	B -3	8-5			E-1	E-3	E-5	F-1	F-3	F-5
C	5 x 9	5.015	5.015	4.890	4.765	83/4	827	815	5 3 8	$3\frac{1}{4}$	2 29 32	215	231	11 16	3 4	13
D	5½ x 10	5.515	5.515	5.390	5.265	93	927	9 15	578	31/4	$3\frac{13}{32}$	37/16	3 15 32	11 16	3 4	13
E	6 x 11	6.015	6.015	5.890	5.765	$10\frac{3}{4}$	10 27	1015	678	35	3 15 32	31/2	3 17 32	11 16	3 4	13
F	6½ x 12	6.515	6.515	6.390	6.265	113/4	1127	1115	73	4 1 8	3 31 32	4	4 1/32	11 16	3 4	13

MAGNUS METAL CORPORATION

Standard bearings are increased ¼" in overall length, giving greater bearing area and reduced lateral play. Step sizes are also increased in length (see above), tending to reduce lateral play on worn journals. This, together with new lug location, gives more balanced thrust loading than standard bearings have ever had before. Fillet radii have been in-

creased at both ends of the bearing for further reduction in end wear and reduced wiping of the babbitt at both fillets.

These design modifications should help establish a new high in the performance of low-cost solid bearings. For further information write to Magnus Metal Corporation, 111 Broadway, New York 6, or 80 E. Jackson Blvd., Chicago 4, Ill.

MAGNUS

Subsidiary of NATIONAL LEAD COMPANY





Tank cars have joined piggyback cars in equalling standard passenger car length. These two 85-ft tankers will move propane from Southwest.

Sets New Record . . .

Union Tank Builds 30,000-Gal. Cars

Tank cars are getting larger and larger. Union Tank Car Co. has just completed two 30,000-gal., 85-ft cars which are being used by the Tuloma Gas Products Co., Tulsa, Okla., to move liquified petroleum gas. Capacity of these new HD-30 cars is 8,300 gal. more than that of the 65-ft tankers placed in service in 1959, which until now had been the largest tank cars in unrestricted interchange service.

Union's HD-30 (Hot Dog) design utilizes the structural strength of the tank to eliminate the center sill between the trucks. The use of the tank both as a structural member and as a container is a feature which has been incorporated in over 400 HD cars over the past three years. The prototype, a

10,000-gal. car, was introduced in 1957. In 1958, Union Tank Car pioneered the 20,000-gal. car, following the same design. In all cases, the draft sills are welded to the tank and the completed assembly is mounted directly on the trucks.

The ICC classification of the HD-30 is 112A400-W. The shell was not insulated in order to reduce costs and to make possible maximum capacity.

The tank of the 85-ft car is made of seven barrel sections, each with a plate thickness of 25/32 in. Material is ASTM A-212, Grade B boiler-plate flange steel. Longitudinal and circumferential seams were welded by the submerged arc process and all welds were completely radiographed. The

99-in. diameter shell weighs 67,545 lb. Tanks are designed for 1,000 psi bursting pressure and will be tested periodically to 400 psi.

Each car has three Bastian Blessing 1½ in. angle valves and three check valves, the latter providing a maximum 100 gpm flow rate. There are two 2-in. loading and unloading pipes. The Midland A-311, 300 psi safety valve is rated at 42,200 cfm.

Light weight of the completed car is 108,000 lb and the loaded weight is 251,000 lb—rated capacity of the 6½ by 12-in. Timken Class F, heavyduty AP roller bearings. The Barber S-2-A trucks have 2½ in. travel springs, Scullin side frames, and 36-in. Class C multiple-wear wrought-steel wheels. The cars have Miner A22XL draft gears and standard E type couplers. The brake systems are fitted with Westinghouse D211D1 automatic slack adjusters.

The cars are 85 ft ½ in. over coupler pulling faces and have a maximum height of 14 ft 7-1/16 in. The overall width is 9 ft 6 in. Over heads, the shell is 79 ft 5 in. long.

Tanks for the cars were fabricated by UTL's Graver Tank Division and the cars themselves were assembled at the UTL shop in Whiting, Ind.

Commenting on the new design, E. A. Locke, Union Tank president, said, "The two new cars represent a new concept in the transportation of bulk liquid products. They are particularly adaptable for shipments of LP gas and other relatively light commodities."



Draft sills are welded to tonk at Graver plant. Principle of using car body as structural column to transmit buffing loads is not new, but UTL has been most successful in its application.



what the well-built freight car will wear this season





(with speed nut #2)

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Blast building prepares Canadian National cars for painting at Point St. Charles shop, Montreal. CNR has similar installation at Winnipeg shop.

CNR Speeds Car Exterior Cleaning

New facility includes Rotoblast installation and priming area where cars are readied for painting

PREPARATION OF FREIGHT CARS for painting at the Point St. Charles shop of the Canadian National in Montreal has recently been speeded. A modern three-section building built about a Rotoblast-Airblast car-cleaning installation does the job faster and more economically.

Previously, two men took a total of 12 man-hours to clean an average box car. Now the job is done with a little less than four man-hours per car. The operation is a 27-min cycle, handling 17 cars in an 8-hr day with eight men. The previous process—an airblast room supplemented by some wire brushing—could not give the output or the quality of cleaning required.

Heart of the new reconditioning line is a 115-ft blast cleaning room manufactured by the Pangborn Corp. This room includes a 25-ft Rotoblast section where eight airless, centrifugal wheels hurl a total of 120,000 lb of abrasive per hour onto the top and sides of cars moving slowly through.

To give some idea of the savings as compared with airblast, it has been computed that a 2,000-hp air compressor would be required to throw the same amount of abrasive by airblast. This would be prohibitive in cost. One man with airblast catches the front ends of cars moving in. The car is halted for 4 min to enable the rear end of each car to be blasted. There are also special abrasive blowoff stations.

About 8 min of the time required is taken by Rotoblast. The rest of the 27-min average is used for drying, truck changes, airblast, blowoff and priming.

Car Movement

Most of the cars to be reconditioned are moved up to the building by a Trackmobile. They can then be moved into the building with the Trackmobile or by a capstan-type car puller. Two cars are moved into the drying area at one time.

At this point, six overhead heaters dry the two cars simultaneously—removing moisture, snow and ice. The heater installation in this drying section has a rating of 2,440,000 Btu per hr. Under the most unfavorable conditions, it requires approximately

one hour to dry a car so that it is ready for blasting.

While cars are being dried, they are lifted off their trucks and placed on auxiliary or dummy trucks-necessary to prevent the blast process from cutting into journal boxes. When ready, each car moves into and through the blast-cleaning area on the auxiliary trucks. It is pulled by special car-moving equipment built into the Pangborn installation. The same moving equipment is used for the trip through the roof priming area. After priming, the cars are moved from the dummy trucks back onto their own trucks and leave the building, moved by capstan type car pullers and gravity down a slight grade until slowed and stopped by skid-type car retarders.

Initial difficulty in handling the trucks of cars undergoing blasting has been solved by installing trolley-mounted electric hoists in the drying room and the priming area. The monorail in each case is an I-beam extending across the shop building perpendicular to the track. This makes it possible to lift the auxiliary trucks

(Continued on page 44)



Have your General Electric Service Shop Remanufacture your traction motors

Now, you get more miles under a locomotive out of traction motors rebuilt by your General Electric Service Shop. A new repair product, better than any previously available, offers you top performance under virtually any operating condition.

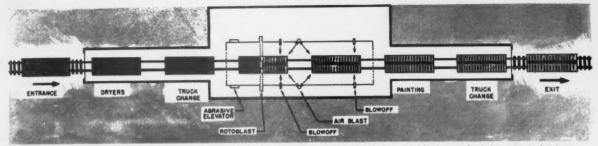
Commutating coils are now cured by an exclusive bag-molding process to provide a heat-resistant, mechanically tough structure. Armatures are rewound with factory furnished coils, epoxy impregnated in three vacuum pressure cycles to effectively tighten the unit, and roll-cured to provide uniform insulation thickness and eliminate surface drips.

The entire winding has been re-engineered to assure maximum heat transfer through the insulation system so that the repair product will run cooler and give you more miles in service. Long motor mileage is not solely a function of the insulation system, however. To assure top performance, all the mechanical components of the motor must be brought back to factory-fresh condition. For instance, the armature has to be dynamically balanced; bearing and axle fits have to be built up and re-machined to renew their original close tolerances.

To learn how you can get more miles per rewind and better all-round performance from your remanufactured traction motors, call your General Electric Service Sales Engineer or write for Bulletin GEA-7114, General Electric Co., Section 801–02, Schenectady 5, New York.

Progress Is Our Most Important Product

GENERAL (ELECTRIC



Sequence of operations in the preparation of car exteriors for painting involves initial drying, grit blasting, and priming prior to leaving.

(Continued from page 42)

and each car's own trucks on and off the track so that the body and trucks can be moved through in the proper sequence when the track is cleared. Space between the walls of the building and the cars permits the different types of trucks to be placed there during moves, when necessary so that trucks can go through in sequence.

The blast-cleaning section is sealed off from other areas by power-driven roll-up steel mesh doors at both ends. The door openings are 15 ft wide and 17 ft high.

Controls in the Rotoblast section

cause the blast action to start automatically as cars enter the blast zone and to stop as the car emerges from it. There are controls also for cutting out the overhead Rotoblast units and sealing them off during blasting of open-top cars.

The airblast and blow-off section is 90 ft long, 20 ft high, and 20 ft wide. It is equipped with walkways at two levels so airblast operators can reach all points on the cars for airblast touch-up if necessary. Lighting is comprised of 98 ceiling-mounted fixtures, and 68 wall lights which are mounted 5 ft apart in double banks on each side of the airblast section. These lights are protected by Pyrex glass globes ½ in, thick.

Airblast is provided by two AQ-1 continuous automatic direct pressure airblast machines, each equipped with safety blast controls. Each machine has a 30-in. diameter by 72-in. high abrasive tank with 14.1 cu ft capacity. There is a timing mechanism which refills the blast tanks for continuous

operation.





Dummy trucks are installed, and chain type device moves car into blast room as mesh door (left) closes. Duration of blast can be adjusted at the control panel (right).

152522

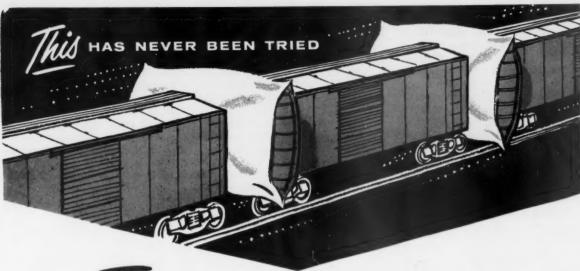
Following completion of automatic grit blast operation on sides and roof, an operator cleans the rear of car. Previously, he has done the front end after car entered room.

Abrasive Handling

Abrasive handling both for the Rotoblast and airblast sections is completely mechanized. Spent abrasive falls through grated floor plate into steel hoppers below. Heavy-duty longitudinal oscillating conveyors and cast-steel crossfeed screw conveyors carry the abrasive to a steel-encased, belt-bucket type abrasive elevator which moves it up to two abrasive separators. The separators are pneumatic airwash units which remove fine refuse combined with screen wheel sections for removing coarse refuse. An abrasive storage bin holds the cleaned abrasive and feeds it both to the Rotoblast and airblast operations.

The abrasive used currently is a mixture of 60 per cent G-18 grit and 40 per cent S-390 steel shot. Abrasive

(Continued on page 46)



BUT HIS HAS BEEN TRIED ...



Keystone SHOCK CONTROL provides effective protection from damage to lading in a freight car, and to the car itself. SHOCK CONTROL is an integrated system designed to give maximum cushioning to a car body without changes or additions that would cause it to be regarded as "special" or to be handled in any way other than as standard equipment. The Keystone SHOCK CONTROL system, featuring the hydraulic cylinder, floating center sill and two sets of return springs, absorbs direct impact energy during coupling and run in . . , helps reduce damage substantially!

FOR FURTHER INFORMATION SEND FOR THIS

FREE BOOK TODAY!



KEYSTONE RAILWAY EQUIPMENT COMPANY

80 East Jackson Boulevard Chicago 4, Illinois

Canadian Representative:

INTERNATIONAL EQUIPMENT COMPANY LIMITED

P.O. Box 2200, St. Laurent Montreal, Quebec



(Continued from page 44) consumption averages about 10 tons a month at peak periods.

Speed of cars through the blast-cleaning process is variable. Depending on the degree of cleaning considered necessary to recondition particular cars, speeds through the Rotoblast area vary from 1 to 5 ft per min. Cars are easily stopped for airblast when necessary. Normally, they proceed through the blowoff mechanisms at 5 ft per min. Blowoff is automatic, but there is also provision for manual blowoff if necessary.

Priming is now done manually by

two men using pole guns, but later some automatic painting process may be installed. While the new cleaning process has been in operation for only a short time, it is expected that the paint will last considerably longer on the properly cleaned surfaces of the cars.

Dust is controlled by a Pangborn cloth screen dust collector mounted inside the building over the blast-cleaning machine. This collector exhausts a total of 55,440 cfm at 5 in. static pressure. Cloth ratio is 3.03 to 1. The collector consists of double classifer section, a double screen sec-

tion, and a double outlet section. It is equipped with a Polyflex timer to permit periodic automatic rapping and cleaning of the cloth screens. Screw conveyors route the collected dust to a removal point.

The new clear-cleaning set-up at CNR is intended to clean and recondition all types of rolling stock, except locomotives. To date, it has been used mainly for freight equipment—flat cars, box cars, and gondolas. Additional speed and efficiency is expected when the installation of additional handling equipment is completed.

How Seaboard Uses Steel-Corr

A car-lining material which makes possible the rapid upgrading of box cars has found wide acceptance on the Seaboard. The road is now using Steel-Corr reinforced paperboard sheets when it is necessary to supply shippers with cars having acceptable interiors in minimum time.

Prior to the adoption of Steel-Corr, temporary repairs were made by cutting out and replacing lining in damaged areas. This was expensive and, according to the Seaboard, gave an appearance to the interior of the finished car which was not always satisfactory to the shippers.

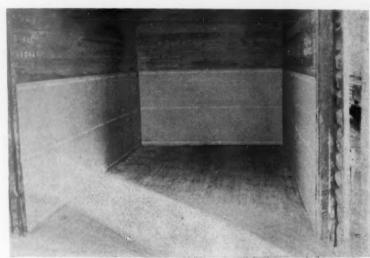
SAL mechanical officers are quick to emphasize that use of the new product does not constitute a permanent upgrading. While it has some water resistance, an installation of Steel-Corr makes it inadvisable to use streams of high-pressure water to wash car interiors. With normal usage, the Seaboard is finding that the Steel-Corr will last for an average of about six loadings before it must be renewed. The material should not be used, the Seaboard says, when time and facilities allow the car to be shopped for a complete and permanent new side and end lining-an interior which is more durable, and expensive.

Tests with International-Stanley Steel-Corr started last November and





Application of Steel-Corr is two-man operation at typical Seaboard facility.



Installation of Steel-Corr produces an interior which railroad and shippers find attractive.

now most car repair tracks make some use of the product. It has been found that a lining which is one sheet (4½ ft) high gives a smooth interior which fits the needs of most shippers. The liner is used only to produce Class A cars for loading of shipments in cartons and bags, but also as a preparation for shipments of bulk products such as phosphate. As furnished, the

Seaboard finds the material easy to apply. Two man-hours will complete a typical car.

Steel-Corr, the Seaboard says, provides a speedy method of upgrading when car shortages develop. It makes possible the utilization of equipment which would otherwise have to be held for shopping or assigned to rough freight service.

Visit the Pullman Exhibit on Tracks 7 and 8 at the

Railway Electrical and Mechanical Supply Association Show San Francisco, June 13-14-15-16

Ask the Man in the Red Coat about

PULLMAN EQUIPMENT FOR COORDINATED TRANSPORTATION

See TODAY'S NEW DIMENSION in the fields of Piggyback and Containerization



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PULLMAN-STANDARD
Advanced Railroad Rolling Stock for
Piggyback and Containerization



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Railway Electrical and Mechanical Supply Association

EXHIBITORS

123-125 223-224 305-306

Exhibits at Jack Tar Hotel

Exhibit areas at Jack Tar Hotel are adjacent to the International Room and the California Room where the Mechanical Division and Electrical Section will meet. All exhibits will be open from 2 p.m. Monday, June 13, to noon Thursday, June 16.

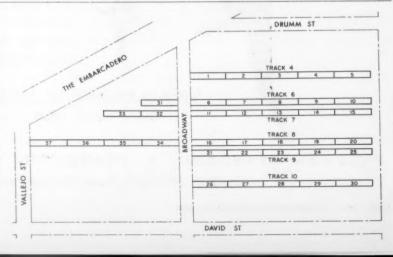
EXHIBITORS Aeroquip Corp. Ajox-Consolidated Co. Albert & J. M. Anderson Allison Division, General Motors Corp. AMP Co. Anacondo Wire & Cable Co. Buckeye Iron & Brass Works C & D Botteries Division, Electric Auto-Lite Co. Chicage Printed String Co. Current Controls Corp. Davis Brake Beam Co. Dayco Corp. (formerly Dayton Rubber Co.) Delco-Remy Division, General Motors Corp. O Company 206-207 232-233 218 101 238 228 229 230 231 306 305 118-119 230-231 Detca-Remy Division, General Morors Corp. DO Company Edison, Thomas A., Industries Electro-Motive Division, General Motors Corp. Exide Industrial Division, Electric Storage Battery Co. 135 201-202 226 216 Electric-Monitar Orbitalin, General Motors Corp. Exide Industrial Division, Electric Storage Bothery Co. Farr Co. General Electric Co. Gould-Notional Batteries, Inc. Hanlon & Wilson Co. Helwig Carbon Products, Inc. Hyatt Bearings Division, General Motors Corp. K. W. Battery Co. Line Material Industries, McGraw-Edison Co. Mognus Metal Corp. Miller Lubricator Co. Minnesota Mining & Manufacturing Co. Modern Raliroads National Carbon Co. Nife In-orporated National Carbon Co. Nife In-orporated Pacific Car & Foundry Co. Pocket List of Raliroad Officials Pyle-National Co. Raliway Locamotives and Cars Raliway Locamotives and Cars Raliway Maintenance Corp. Rust-Oleum Corp. Servo Corp. of America Simmons-Boardman Publishing Corp. Sperry Rail Service, Division of Howe Sound Co. 111 Stran-Steel Corp. Strato-Flex Corp. Thomas & Betts Co. Timken Ralier Bearing Co. Turco Products, Inc. Trane Co. 115 and 117 107-108 209-214 INTERNATIONAL 225 217 ROOM 121-122 224 218 204-205 LOBBY 103-104 120-130 IBIT EXHII CALIFORNIA 236 301-302 ROOM 105-106 236 .. 111, 112 and 126 228-229 133 225-227 Turce Products, Inc. Trane Co. Vapor Heating Corp. Westinghouse Air Brake Co. 303 220-222 ELDORADO ROOM

Track Exhibits

Track exhibit area at Drumm and Broadway is some distance from the Jack Tar Hotel. Bus service is provided between the two points.

EXHIBITORS

Aeroquip Corp	10
Budd Co.	6-7
Carrier Corp.	35-36
Electro-Motive Division	37
Evans Products Co.	
Huck Manufacturing Co.	
Hydracushion Incorporated	
Magor Car Carp.	8-9
Midland Resin Co.	3-5
Minnesota Mining & Mfg. Co.	26
Pacific Car & Foundry Co.	2 and 27
Pullman-Standard, Division of Pullman, Inc.	
Rail-Trailer Co.	
Sparton Corp.	
Trane Co.	31-32
Westinghouse Air Brake Co.	





D. J. Russell President, SP



C. D. Buford Vice-President, AAR



D. W. Brosnan Vice-President, Southern



E. Hutchinson Member, ICC



S. M. Houston (SP) Chairman



J. W. Hawthorne (ACL) Vice-Chairman



F. Peronto Exec. Vice-Chairman



F. H. Stremmel

Program

Thirty-Third Annual Meeting

Mechanical Division

Association of American Railroads International Room, Jack Tar Hotel, San Francisco

Tuesday, June 14 10 a.m.

Joint Session with Electrical Section:

Address-D. J. Russell, president, Southern Pacific Lines

Address—C. D. Buford, vice-president, Operations and Maintenance Department, AAR

Address-Chairman S. M. Houston

Appointment of Committees on Subjects, Resolutions, etc.

Report of General Committee

Report on Mechanical Research

Report of Nominating Committee

Discussion of Committee Reports on:

Locomotives

Lubricants and Fuels for Diesel locomotives

Axles

Geared Hand Brakes

Specifications for Materials

Safety Appliances

Wednesday, June 15

9 a.m.

Address—D. W. Brosnan, vice president—operations, Southern

Discussion of Reports on:

Arbitration

Prices for Labor and Materials

Brakes and Brake Equipment

Couplers and Draft Gears

Car Construction

Loading Rules

Forest Products Loading

Thursday, June 16

9 a.m.

Address—Hon. Everett Hutchinson, member, Interstate Commerce Commission.

Discussion of Reports on:

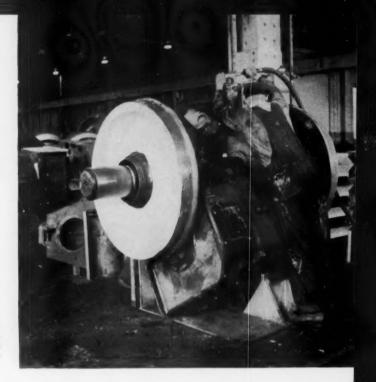
Wheels

Tank Cars

Journal Roller Bearings

Lubrication of Cars and Locomotives

Milwaukee Improves Its Wheel Mounting



Stand developed by Milwaukee shop positions motor, wheels, and bearing caps for easy application and assembly. Development of such specialized equipment has been factor in increasing speed with which job is completed.

Installation of locomotive wheel sets in traction motors is now a one-spot operation in the Milwaukee Road's Milwaukee, Wis., shop. Six shopmade stands for six motors are served by a 4-ton overhead crane. Two machinists complete one assembly per hour.

Each stand has its own supply bin holding gaskets, shims, bolts, dust caps and lockwashers. There is also a rack for the gear case at each stand. Tool room attendants fill the supply bins.

A hinged tray on the rear of the stand is designed to hold the suspension bearing caps. These caps are slid on and off the tray by hand, eliminating any use of the crane other than for placing the motor on the stand and then positioning the wheels.

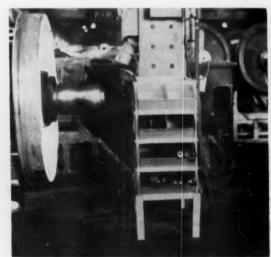
The portable stand holds the traction motor at an angle so that the suspension bearing split line is parallel with the floor. The wheel set can then be lowered into place instead of being guided into position at an angle which could damage the bottom half of the suspension bearing.

The eleven steps involved in the assembly of the wheel set and traction motor are: Set up motor in the stand; remove bearing caps; place bottom halves of suspension bearings in place; lower wheel set into the bearings; apply tops of the suspension bearings; apply axle dust guards; apply pinionend dust guard; apply bearing caps; tighten cap bolts; apply gear case; wire bearing cap bolts in place.

Prior to adopting this system, the machinist and two helpers working on a truck would mount the wheels for that truck. This method frequently tied up the main overhead crane. Considerable time was also lost in getting and handling assembly parts. Production was half the present rate.



Portable motor stands can be placed at convenient shop locations where cranes are available for moving components to assembly sites.



Supply bin for each assembly stand holds all the hardware which is required in the application of wheel set to overhauled motor.





.. a time-proven feature of all

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STEEL CASTINGS for RAILWAY EQUIPMENT



TYPE "F" INTERLOCK COUPLER
AND ATTACHMENTS

RIDE GONTROL (A-3) FREIGNT CAR TRUCK

FREIGHT CAR TRUCK



BUCKEYE SIX-WHEEL TRUCK

FOR COMPLETE INFORMATION . . . GALL OF WRITE



BUCKEYE EIGHT-WHEEL TRUCK



Now!

A <u>lifetime</u> lubricating oil for railroad diesels

Results from 3 years of over-the-rails freight service show that Shell Talona RS Oil 40 is a lifetime lubricating oil for railroad diesels!

New facts about Shell Talona RS Oil 40 performance are still coming in from railroad operators across the country, all pointing to a new concept of locomotive diesel crankcase lubrication.

For example, one major railroad using Talona® RS Oil 40 in heavy-duty freight service reports that its diesels have run in excess of 200,000 miles and give no indication of requiring an oil change.

Railroad operators with the

most experience using Talona RS Oil 40 are convinced that diesel engine life between overhauls can be greatly extended too. Furthermore, their experience indicates that Talona RS Oil 40 will last for the full overhaul life of the engine.

Put this revolutionary new oil in your own diesels and demonstrate these cost-saving results yourself. Contact your nearest Shell Railroad Service Engineer. SHELL TALONA RS OIL 40 is specially compounded for today's high-output railroad diesel engines.

Twice the anti-wear protection. Results show that Shell Talona RS Oil 40 will give at least 4 years of service between engine overhauls against 2 years or even less with conventional oils.

Longer filter life. Shell Talona RS Oil 40, with its excellent filterability, safely absorbs more contaminants than conventional diesel lubricating oils . . . affording still further dollar savings by extending filter change periods. It holds contaminants in a finely divided state to prevent sludge deposit formation which could interfere with proper lubrication.

Unmatched engine cleanliness. Talona RS Oil 40 effectively fights deposit build-up... keeps engines remarkably clean. At the same time it cuts down oil consumption. And you know that a cleaner engine involves considerably less expense at overhaul time.

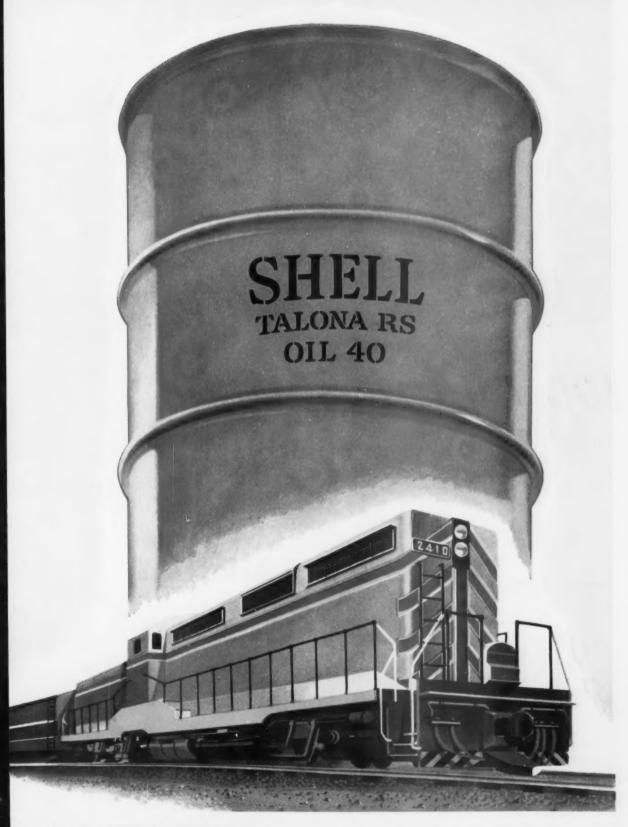
Excellent silver bearing lubrication. Shell Talona RS Oil 40 protects silver bearings. It has special extreme-pressure additives that provide effective built-in protection for the life of your engine.

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APPLIANCE CO.

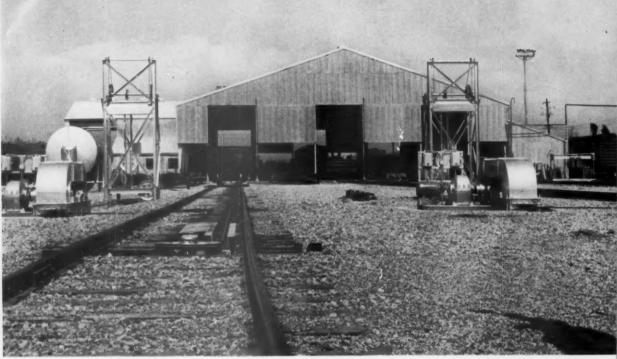


Oll NEW features!

- · EASY TO INSTALL . .
- SIMPLE TO ADJUST . .
 - QUICK TO OPERATE . .

Write for complete details!





Three tracks under cover handle running repairs and periodic work, while one outside track is utilized for heavier work at Birmingham facility.

Spot Repair System Serves L&N

Combining push-button operation with one-spot repairs, the Louisville & Nashville's new frieght-car-repair facilities at Boyles Yard, Birmingham, Ala., turns out an average of 550 light repair cars weekly in a three-trick, seven-day week operation.

There is one work station on each of the three tracks in the repair shed. Each has separate controls to place the incoming car in proper location. Repair parts, and complete servicing equipment and tools at each spot make it possible for the average car to be repaired and returned to the yard in approximately three hours. Under the non-spot, one-trick program formerly used, a shopped car might be inactive for two days or more.

Bad-order cars are moved by a switch engine to one of the lead tracks to the repair shed. A Trackmobile pulls the car to a point outside the shed where mechanical cable pullers take over. The cable is fitted with a hinged bar, or puller dog, which fits behind the car axle. Push-button controls operate the Link-Belt pullers to move the car into the shed. Car stoppers spot the car at the proper jacking location. After repairs, the cars are pulled through the shed to outgoing tracks for return to the train yard. An additional track outside the shed,



Equipment and facilities at the three spots under the shelter roof are all duplicated. Car-moving within this shop is accomplished with the cable-powered puller dog operated by push buttons.



Water and air are supplied through reels at cleaning track.



Trackmobile moves bad-order cars up to cable pullers.



Puller dog behind axle propels car into the shop.

Boyles Yard

not equipped with pullers, is set aside for heavier repairs.

The repair shed is equipped with a 3-ton, 40-ft bridge crane which runs across the shop perpendicular to the

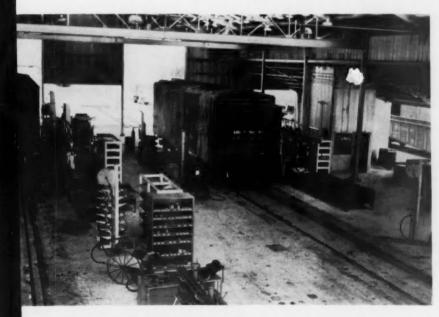
repair tracks at the spot locations. Each track station has hose reels for journal-box oil, air and oil for cleaning journal boxes, oxygen, acetylene, and compressed air for testing brake equipment. Electric screw jacks, power tools and arc welder machiners are also available. A Hughes-Keenan lift-truck crane handles wheels, side

frames, and bolsters to the repair stations.

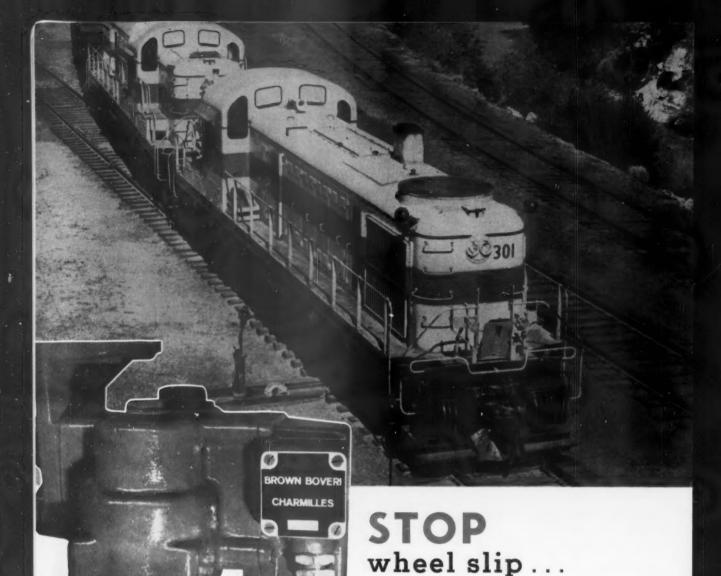
Wheels which come from the South Louisville, Ky., wheel shop are taken directly from cars at one end of the repair shed. Miscellaneous wheels are stored on stub tracks. Each spot has repair parts binned between the tracks, with fast-moving items nearest the work station. Repairs are generally made on a replacement basis. Where feasible, the removed parts are then sent to South Louisville for reclamation. No painting is done at this facility. The repair trackage has a capacity of 72 cars.

The two-story concrete-block car service building, adjacent to the prefabricated metal repair shed, serves as the headquarters for supervisory personnel. The air-conditioned structure also has storerooms and wash and locker facilities for the mechanical department forces.

Separate from the car-repair operations, but part of the new facilities, is a 40-car clean-out track. All the work is done at one-spot locations. In addition to removing debris, washing and cleaning the cars, some minor repairs are made. Some 75 to 100 cars are serviced each day, seven days a week



JUNE, 1960 . RAILWAY LOCOMOTIVES AND CARS



The Brown Boveri Charmilles Anti-Slip Brake is in satisfactory operation on 2,500 hp., 4-axle, Diesel locomotives on one major Class I railroad and is now being tested by others.

Runs made on locomotives equipped with recording tapes have proved that the device is highly effective.

When one pair of wheels hits a slippery spot and loses adhesion, the speed of that axle increases sharply. The condition immediately becomes evident to the operator of a single-unit locomotive. He touches a button and by means of this quick-acting valve, all brakes are applied electrically in 4/10 of a second. It is a light application of about 15 pounds and may be released as quickly as it is applied. This stops the slipping pair of wheels promptly since there is little inertia to overcome.

The locomotive is only slightly retarded because its inertia is high. This brake application reconditions the treads of the slipping wheels so they will not slip so easily again.

The device is available with manual control for single-unit locomotives, but can also be used with available adhesion loss detectors for multiple-unit operation.

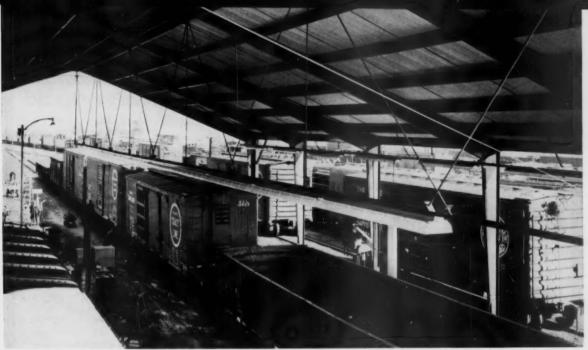
without sand

It is now possible to dispense with the use of sand. The expense of sanding facilities and subsequent cleaning of ballast, fouled switches and signal failures due to sand are eliminated.

The Brown Boveri Charmilles Anti-Slip Brake is being marketed in the United States by Railroad Supply and Equipment, Inc., Clarks Summit, Pennsylvania.

RAILROAD SUPPLY & EQUIPMENT, INC.

Clarks Summit, Pa. • Telephone: Clarks Summit JUNIPER 6-2611



Round-the-clock, expedited light car repairs can be made at ACL facilities such as this at Rocky Mount, N.C. New record system matches rapid pace.

How ACL Simplifies AAR Billing

To keep pace with today's increasing tempo of car-department operations, the Atlantic Coast Line has developed a new and faster method for preparing and processing AAR billing repair cars. "Coded repairs," as the ACL calls the system, complies with the letter and intent of the AAR Interchange Rules. At the same time, complete data on repairs to foreign cars is accumulated and handled with considerable savings in time and labor.

After several months of development by the ACL mechanical department, the coded repair system was put into operation at the road's light repair tracks on May 1, 1959. Initial uncertainty about the effectiveness of the system was quickly dispelled and, with little alteration, the procedures are used at all freight-car repair points on the ACL today.

The Arbitration Committee of the AAR Mechanical Division carefully examined the practices and was able to make only minor suggestions concerning possible improvements. It is expected that the Coast Line's method will be submitted at this month's Mechanical Division meeting as an acceptable alternate for the lengthy, handwritten, or typed reports now required.

The Mechanical Division's Manual

of Recommended Practice now says "the original record of repairs shall be written at the car on AAR billing repair card forms, the carbon copy of which shall serve the purpose of original record of repairs as well as the record of repair cards." Interchange Rule 7 spells out the requirements for using and issuing billing repair cards.

In common with many roads, the ACL has been installing one-spot car repair facilities at several points. The accounting system which it has developed is "tuned" to the fast pace which these modernized rip tracks set.

One way of achieving this is to do as much of the "paper work" in advance as is possible. Another is to systematize and classify freight-car repairs—assigning code numbers to operations and materials once they have been so thoroughly classified that no subsequent confusion is possible. Having done these two things, the amount of writing necessary to describe any repair is minimized.

In setting up a code system, numbers were based on the item and page numbers from the interchange rules. For instance, operations involving journal bearings and wedges are classified as follows:

Code 162-1 to 162-8. Application of from one to eight new 8-in. journal

bearings without associated repairs and because bearing or bearings are worn out.

Code 162-9 to 162-16. Application of from one to eight new 9-in. bearings, reason same as for items 162-1 to 162-8.

Code 162-17 to 162-24. Application of from one to eight new 10-in. journal bearings, reasons same as for items 162-1 to 162-8.

(Continued on page 89)



Flourescent lighting system at Rocky Mount simplifies the night repair operations there.

WAYS YOU CUT COSTS WITH SCHRAMM COMPRESSORS

there's no vibration!



you don't have to reinforce floors

any space serves as base no special foundation just bolt it down



you can move compressor any time



Schramm compressors are compact

integral cooling system saves space put unit overhead or in odd corners

5 you get a complete package

one unit has everything you need for any air requirement



f you eliminate central compressors

unit system allows you to buy only the Schramm compressor you need, add as requirements grow

AIR COMPRESSORS 758 North Garfield Ave., West Chester, Pa

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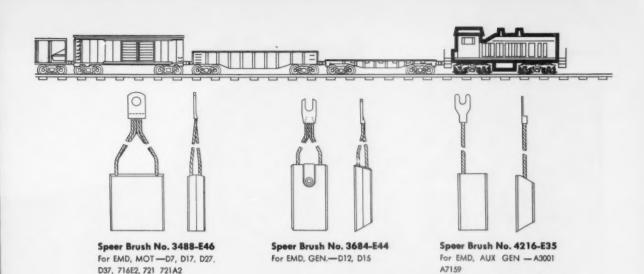
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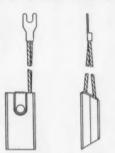
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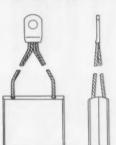
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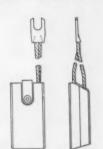




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Railroad Lubricants (Sinclair



It was a beautiful spring morning. Pete, usually the unhappiest fellow around, was just arriving at work in very good spirits. He was thinking about the fishing season that opened the next day. As he walked past the office, Pete stuck his head in the door and asked his boss, Big Jim, "Are you ready for that fishing trip tomorrow?"

"Sure are," said Jim looking up unhappily, "if the men with the white coats don't come for me first."

It was unusual for Jim to be complaining; usually Pete did enough for everyone.

"What's biting you this morning," asked Pete as he stepped into the of-

"Well, a mechanical reefer came in here last night with some sort of trouble and the night gang still hasn't been able to find what's causing it. If we don't get the refrigeration equipment going pretty soon, we're in trouble because the car's temperature is going up. Will you get out on it as soon as you change your clothes? I'll have some one there to help you."

"What does it do, or what doesn't it do?" asked Pete.

"Well, it keeps blowing fuses and we can't keep anything working long enough to cool the car," Jim replied, shaking his head in disgust.

"Did they put it on standby power vet?"

"No," snapped Jim, "what good would that do? It's blowing fuses, so how could standby help us?"

"It could help if the power plant is in trouble. Just because fuses blow doesn't necessarily mean the trouble is on the load side. It could be on the generator side. I'll get right out there."

A few minutes later, Pete arrived at the car with the tool kit and almost immediately was joined by a second man. "Well, Greg," Pete greeted him, "glad to see that Jim was finally able to let you get out here on a car. I've been watching you during our class sessions. I know you've been doing some studying, but you'll find the actual work most valuable."

"I sure am glad to get in on one of

these jobs," Greg answered with a broad grin.

Pete looked into the car's machinery compartment and pointed out the Witte engine and Carrier 66E3 refrigeration equipment. He told Greg that the Witte was an horizontally opposed two-cylinder diesel. Having repeated Jim's description of the trouble, Pete said that the first thing he wanted to do was to put the car on standby power. Greg, duplicating Big Jim's response, asked what good that would do if the car was blowing fuses.

"Let's do it anyway," Pete answered.
"Do you think you can hook up the standby?"

"I think so. Here's the power plug on the front of the engine. The female receptacle is on the power side and the plug is on the load side. So if I pull the plug and plug it into the standby cable that should do it. Right?"

"That's right," said Pete, "and over there is the standby cable."

Greg brought the cable to the car and was just about to pull the plug when Pete stopped him. "Wait a minute; didn't you forget something?"

Greg looked at Pete and then grinned sheepishly. "Yeah, guess I did; I forgot to stop the engine. I could have had some fire at that plug pulling it with power still on it. I guess that shows that haste makes waste."

Greg stopped the engine and applied the standby cable. Before he closed the main switch on the standby cable circuit, Pete had him change the main fuses of the control circuit. Pete also pointed out that they were not just ordinary fuses, but were Fusetrons.

"Oh, these are those time delay fuses that you talked about some time ago during class. By using these it is possible to fuse closer to the actual rating of devices, such as motors, because they won't blow immediately on a temporary overload. Only if the overload continues will the Fusetron blow, still protecting the motor."

"I see that you are listening and learning, Greg," smiled Pete.

After the Fusetrons were changed and the main switch in the standby cable circuit was closed, Pete checked his watch. Immediately the condenser

fan started running and in about 20 seconds Compressor No. 1 started running. Five seconds later, Compressor No. 2 started. By that time Pete was up in the machinery compartment and was checking the two refrigeration systems by feeling the pipes and compressors. He also checked the Freon levels in the receivers.

Several minutes passed before Pete said anything and, finally, he remarked: "Well, things seem to be all right on standby. Both refrigeration systems are still working, and we haven't lost a Fusetron yet. Just as I suspected, the night gang looked for trouble on the wrong side of the equipment. The load is all right; our trouble is in the power plant."

"I still don't get it, Pete. If there was trouble with the power plant, why didn't the night gang catch it?"

"That I can't answer. They weren't on the ball, I guess. Now, how about checking the oil level in the engine."

Pete pointed out the bayonet gage. Greg reported the engine had plenty of oil. In fact, it was more than full. Pete asked for the dip stick and took some of the oil between his fingers, felt it, and then smelled it.

"Looks like we have some fuel dilution; that's what is causing the high oil level. Well, let's start the engine again and see what we have."

Pete stepped back and let Greg start the diesel. It didn't start easily. It should have because it was still warm. When it did not turn over, it seemed to come up to speed properly. Pete showed Greg how feeling the highpressure fuel lines to the fuel nozzles would enable him to detect the pulses as fuel was injected. He said that if there was a bad nozzle, it could be quickly picked up in this way. While he was talking, the engine seemed to miss fire momentarily. Before either of them could check the high-pressure lines, the engine smoothed out and was apparently normal again. They continued to watch and listen. Finally Pete said: "There may be water in the fuel tank. That could have been water pressing through the nozzles. However, with the fuel dilution that we have, I believe we have a bad nozzle.

This is the thirteenth article in this series discussing the operation, maintenance and trouble shooting of mechanical refrigerator cars.

The engine is running with no load now, so we aren't using too much fuel. Let's take the refrigeration equipment off standby and put it back on the car's own power plant so we can load the engine. Go pull the switch on the standby circuit, Greg."

As soon as the refrigeration equipment had been connected to the engine again and the 20-sec and 5-sec time delay relays had brought in the second compressor, black smoke started pouring out of the exhaust stack. Along with the smoking exhaust, the engine began to slow down. Pete was busy feeling the high-pressure lines. Suddenly, the engine speeded up and the smoking stopped. Greg looked at Pete and said: "What caused all of that?"

"Well," Pete said, "the last thing that happened was that the main Fuse-trons blew and removed the load from the engine. We've got some trouble with one nozzle. It's sticking, or is damaged in some way. Just when full load went on the engine, that nozzle cut out so that the engine was trying to run on one cylinder. That caused an overload on the remaining cylinder which produced all the black smoke. We will have to pull that nozzle and see what we can find.

"You might as well put the equipment back on standby so we can get

car temperature down and hold it there while we are working on the engine. When the engine speed dropped with the overload on one cylinder, voltage out of the alternator dropped. With a lower voltage, the motor current went up and caused the main Fusetrons to blow. That motor drives two compressors and a condenser fan."

"Isn't there any other way of telling whether a nozzle is defective," Greg asked. "My fingers must not be as sensitive as yours because I couldn't feel anything."

"Yes," Pete replied, "the high-pressure lines to the nozzles can be loosened. First do it at one nozzle and then the other. By loosening these lines, high-pressure fuel from the injection pump is released so that cylinders can be cut out. I would have used this method, but time didn't allow it.

"The load on the engine has been removed and, if you feel the pipe now, you will see that the cylinder is apparently firing properly. If a nozzle was so bad that it would atomize no fuel, cutting it out would not change the engine operation. If we cut out the nozzle that was working properly, we would stop the engine immediately. Loosening the high-pressure fuel lines is similar to shorting out spark plugs on a gasoline engine. Your trouble

was that you did not realize what you were checking when you felt the fuel jumpers.

The two fellows were in the process of removing the bad nozzle. After getting it out, they took it into the shop. There they had a nozzle testing instrument. They discovered that the nozzle would stick intermittently and then would work satisfactorily again. They dismantled the nozzle and found some lacquer on the nozzle valve. The nozzle was cleaned and the pressure setting adjusted. After calibration, it seemed to be all right. They then installed the nozzle on the engine again. Lube oil and the lube-oil filters were changed because of the dilution. The refrigeration equipment was then connected to the power plant again and then the engine was started. The diesel loaded properly.

Before the car could be switched from the shop area, Big Jim came dashing up to Pete and asked if he knew that the car exhaust was smoking again. Pete returned to the reefer and found that the nozzle was again sticking. The only thing to do was to replace the nozzle. They did not carry this type in their parts stock; it required a canvass of all local diesel engine supply companies to obtain one.

Still later that day, Big Jim asked Pete why the night gang had been unable to discover the trouble. "If those guys would study the manuals that are available and then remember what they read, they wouldn't make mistakes. The manuals we have cover the trouble," Pete replied.

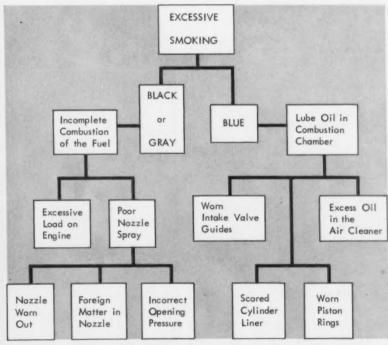
"Wait a minute, Pete, I don't remember that we ever had a manual on the Witte engine."

"What difference does that make?" responded Pete. "It's still a diesel engine. A trouble shooting chart for any diesel engine would show the same thing. The only difference between the Witte engine and any other diesel is a variation in arrangement of components. Any diesel engine has to have a low-pressure fuel pump, a high-pressure fuel pump, and a fuel nozzle. The arrangements may vary, but those components are still there." Pete was really unhappy.

"Would you show me what chart you are talking about?"

The two walked over to the office, and Pete took a manual off the shelf and turned to the trouble-shooting section. He pointed out the chart labeled

(Continued on page 68)



Trouble-shooting chart on which Pete showed Jim how it is possible to analyze the causes of engine smoking. Pete pointed out that the manuals contain much helpful information.



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JUNE, 1960 . RAILWAY LOCOMOTIVES AND CARS

(Continued from page 65)

"Excessive Smoke." "Notice here, Jim, it is divided into two parts. One is for Black or Grey smoke and the other for Blue smoke. Taking the black smoke that we had, it can only mean 'incomplete combustion of fuel.' Now there are several things which could cause that, such as 'Poor Nozzle Spray.' The chart then breaks that down still further: 'Incorrect opening

pressure, foreign matter in nozzle, nozzle worn out.' There is also 'Excessive load on the unit.' As it worked out in this particular case, we had poor nozzle spray. We did find foreign material in the nozzle—lacquer. It was cleaned out and we thought that would do it, but the nozzle failed again. So I am assuming that the nozzle valve had a ridge or shoulder worn into it which we could not see. I certainly

wish we had a high-power magnifying glass so we could check these small parts. I don't like to do a job and then have it fail later because I didn't have the proper tools."

Big Jim realized that Pete had probably saved the load in the car by getting the temperature down. To give his volatile, but competent, mechanic a chance to cool off, he said: "We'll talk about that later."

New Problems in Car Interchange

This is the twenty-fourth installment of a series of questions and answers on the Association of American Railroads Code of Rules Governing the Condition of, and Repairs To, Freight and Passenger Cars for the Interchange of Traffic which may help car men clarify their understanding of the philosophy, intent and requirements of the Interchange Rules. The answers given to the questions are not to be considered interpretations of the Rules of Interchange, which can only be rendered by the Arbitration Committee acting officially. The comments, however, come from a background of intimate association with the application of the rules. Obviously, comments or opinions as of today may be inapplicable after a revision of the rules or further interpretations by the Arbitration Committee.

If a regular flat car is converted to Class LFR and is then destroyed on a foreign line in an accident, what basis should be used for settlement with the car owner? [LFR is the AAR designation for a flat car supplied with a power unit and equipped to handle one or more demountable containers for the transportation of commodities under refrigeration.—Editor.] (258)

Settlement should be on per pound basis for regular flat car as specified in Paragraph 1(a) of Section B of Rule 112.

What basis should be used in settlement for destroyed type LO covered hopper car which is equipped with the Sparger System? (259)

Settlement should be on the basis of reproduction cost as covered in the last sentence of Note 1 of Paragraph 1(a) of Section B of Rule 112, the depreciation for the car, including the Sparger System, to begin on the date that the car

was built, regardless of whether the Sparger System was installed when the car, itself, was built or at a latter date.

In ordering new box and auto cars for delivery after January 1, 1961, what consideration must be given to the side doors? (260)

Under the provisions of new Paragraph (d) (1) of Rule 3, the doors on such cars must comply with the requirements of new pages 47 and 48 of Section C of the AAR Manual of Standard and Recommended Practice.

Do self-locking nuts meet the requirements of Paragraph (c) of Rule 64? (261)

Yes. Charge for such nuts should be on the basis of Items 175-C and 175-D of Rule 101.

Who is responsible for the cost of repairs to slid flat wheels caused by failure of a roller-bearing unit?

Rule 68 provides handling line responsibility for slid flat wheels and, as no exceptions are provided therein, the handling line would have to assume the cost of repairs in such cases.

In rendering bill for partial or temporary repairs to return car to owner as authorized by Paragraph (c) of Rule 120, what basis should be used for charges? (263)

Charges should be handled the same as for repairs to other types of owner defects. Items specifically covered by Rule 107 should be charged on the basis of the provisions of that rule.

In cases where car owner by correspondence requests a defect card from the loading road for damage

caused to a car because it has been loaded with a contaminating commodity, does the loading road have any means of determining, if it so desires, whether the car was actually fit for grain loading or better when it was contaminated? (264)

Yes. The car owner must give the road responsible an opportunity to inspect the car involved before it is repaired, as outlined in Paragraph (12-b) of Rule 32.

Where difficulties are experienced in getting mechanical units in mechanical refrigerator cars to operate properly, are there any instructions or other information readily available which might be helpful in solving the problem? (265)

Yes. Paragraph (e) 2 of Rule 2 requires that a service manual shall be kept in a special receptacle in the unit compartment of each mechanical refrigerator car covering the inspections, servicing and maintenance of such units.

Is charge against car owner permissible for turning wheels under car by use of special wheel turning machine? (266)

Yes. Charge for such work is allowed in the Note following Item 26 of P.C. Rule No. 21.

Why is it important in stenciling COT&S information on the air reservoir of freight cars to follow exactly the sketch shown on page 154 of the 1960 Code of Interchange Rules? (267)

Because any encroachment beyond the space so provided can interfere with subsequent stenciling covering In-Date test. Proper space must always be left for the In-Date test stenciling.



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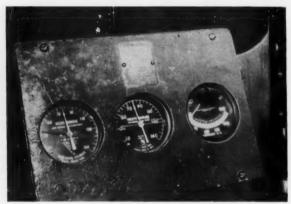


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ELECTRICAL SECTION





Single indicating ammeter (left foreground) replaces seven styles shown with it. New meter fits on diesel gage panels without difficulty (right).

Standardizing Locomotive Control

Western Maryland now uses the same electrical control components on all types of locomotives

All types of Western Maryland locomotives produced by different builders are being equipped with standardized electrical components. Over a period of time, WM has selected one type of voltage regulator, one reverse current relay, and one indicating ammeter, and has applied them as standard equipment for all its diesel units. Selection of standard components was based on operating experience and it was found that the best equipment was

not in most cases the most expensive. Parts stocks have been reduced to a minimum.

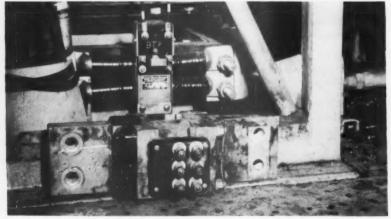
In the process of standardization, devices in service are not immediately replaced with those which have been selected to be standard. Devices which are working well are maintained as long as practicable, using parts in stock or parts obtained from devices which have been removed from service. When operation can no longer be

continued satisfactorily with this cannibalizing, the "standard" equipment is installed.

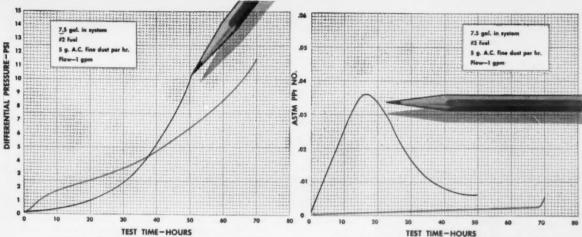
As practiced on the Western Maryland standardization does not cause the railroad to overlook new developments. The better equipment is adopted and the former standard then goes through the process of being replaced.

For example, an EMD voltage regulator costing \$328, was selected as standard. It was used to replace two Allis Chalmers regulators each costing \$690. and having 229 parts. It was also used to replace two Baldwin and two Alco regulators with costs ranging from \$455. to \$717. and having 71 to 91 parts. When the new Fairbanks-Morse transistorized static voltage regulator was developed, tests made on the Western Maryland showed it to have improved performance. It was adopted as the standard. Its cost is \$340. and no replacement parts need to be carried in stock.

Another example is that of the single indicating ammeter which is used on all locomotives. It is an EMD 8214188 meter costing \$39.65. It replaced six meters, costs of which ranged from \$42. to \$175. To make (Continued on page 72)



Standard WM backward transition relay is shop built at cost of \$142.50. It replaces devices applied to locomotives by builders.



Showing comparative flow rate of Conventional Cotton (black line) and New WIX P-1 Porosite (red line) Second Stage Fuel Filters. With 10 psi the condemnation peak note that the old style cartridge has a service life 16

This chart exposes the comparison of oil filtration efficiency. Note the unfavorable peak registered by the Standard depth-type Filtrant. Also note that the oil Standard depth-type Filtrant. Also note that the oil filtered by the WIX P-1 Filtrant never showed more than trace amounts of contamination over its longer life.

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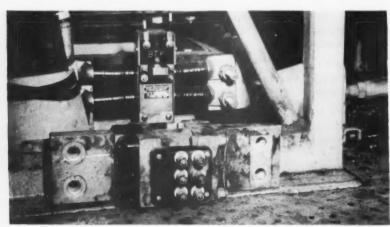
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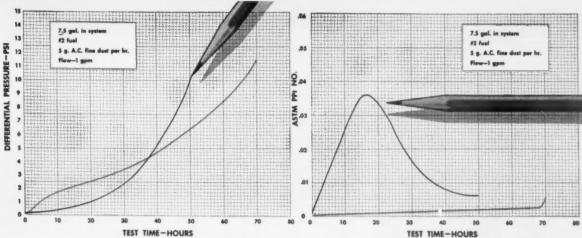
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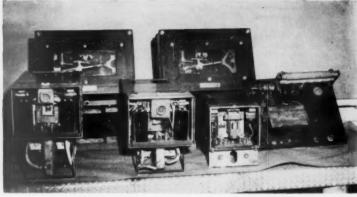
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Transistorized voltage regulator, now standard, is mounted above starting contactors in conventional position (left). Single model takes place of wide variety of types previously used on WM locomotives (above).

(Continued from page 70)

the replacement, the standard meter is mounted on a base on which there is a resistor which is connected in series with the meter. The value of the resistance is set to make the standard meter give the correct reading when it replaces the old. The resistance is an integral part of the base. It has a sliding contact when first installed. After being compared with a test instrument and calibrated for the type of unit on which it is to be installed, the contact is soldered in place. The standard meter has a plug-in mounting for easy removal. The cost of repairing some of the meters which have now been replaced, was more than the first cost of the standard.

The standard reverse current relay is fabricated by the Western Maryland from a micro-postioner, a socket, a resistor and a rectifier. The cost for material is \$25.30 plus labor including a 35 per cent overhead, making a total of \$34.55. It has four replacement parts and displaces four types which were original locomotive equipment. The first costs of the displaced relays varied from \$103. to \$123. It was necessary to carry from 51 to 61 parts in stock for each type of relay.

The requirements for compressor control relays necessitated three standards—EMD parts Nos. 8089175, 8206596 and 8155259. The costs of these are \$41.30, \$33.15, and \$34.65 respectively and the individual types require from three to eighteen repair parts. These compressor relays replace six units costing from \$73. to \$180. which require from 19 to 52 stock parts depending on the type.

The same principle of establishing standards, with similar results, has

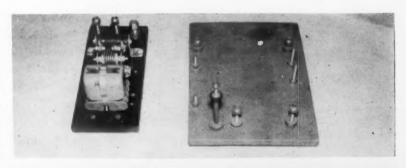
been applied to backward transition relays, battery ammeters, dynamicbrake limiting relays, a-c contactors, multiple purpose relays, batterycharging contactors and ground relays.

Relays are overhauled at eight-year intervals. Good voltage regulation has resulted in obtaining 10 to 11-year battery life.

The railroad reports that the program for replacements with standard items has proved satisfactory and has reduced inventory. In addition, it has been possible to extend overhaul periods with the use of standard items from quarterly to yearly in some cases, and from three months to three years in others. From the maintenance

standpoint, trouble shooting is easier. From the operational standpoint, better locomotive usage is possible, particularly when power from different builders is involved. There has been a marked reduction in road delays attributable to electrical control equipment.

The railroad's mechanical department states that the Western Maryland will remain alert to future developments by locomotive builders and electrical equipment manufacturers. Items offered will be fully evaluated and those proving advantageous will be incorporated into the continuing program. The search for more effective electrical control will continue.





Reverse current relay and its mounting panel (upper), both designed by Western Maryland, mounts readily in control cabinet (lower).



Newly opened, 400-room Jack Tar Hotel on Van Ness avenue in San Francisco is site of Electrical Section meetings and Railway Electrical and Mechanical Supply Association exhibit (p. 48)



G. B. Aydelott (D&RGW)
Guest Speaker

PROGRAM

Eighth Annual Meeting

Electrical Section

Engineering and Mechanical Divisions, Operations and Maintenance Department, AAR

California Room, Jack Tar Hotel, San Francisco

Tuesday, June 14

Joint Session with Mechanical Division in International Room (See Mechanical Division program, page 49).

Convening after Joint Session
Address by Chairman J. J. Schmidt
Report of Committee on Direction
Announcement of new Honorary Life
Members

Appointment of Resolutions Committee
Report of representative on Mechanical
Division Locomotive Committee

Report of representative on Mechanical Division Passenger Car Specifications

Report of AAR representative on ASA Standards Council Report of Electrical Section Representatives to:

American Standards Association American Society of Testing Materials Land Transportation Committee, American Institute of Electrical Engineers National Electrical Safety Code

2 p.m.

Address by G. B. Aydelott, president, Denver & Rio Grande Western

Report of Committee 7—Automotive and Electric Rolling Stock

Report of Committee 15—Relations with Public Utilities

Report of Committee 14—Safety

Report of Committee 17—Application of Radio and Communication Systems to Rolling Stock

Wednesday, June 15 9 a.m.

Report of Committee 18—Wiring diagrams

Report of Committee 13—Railway Electrification

Report of Committee 1—Car Electrical Equipment

Report of Committee 4—Motors and Controls

Report of Committee 6—Welding and Cutting

2 p.m.

Report of Committee 8—Power Supply Report of Committee 10—Wire, Cable, and Insulating Materials

Report of Committee 11—Electric Heating

Report of Committee 5—Illumination

Thursday, June 16 9 a.m.

Address by Dr. G. Wiens, chief director of Locomotives and Cars, German Federal Railways

Report of Committee 3—Air Conditioning and Refrigeration

Report of Committee 9—Corrosion

Report of Committee 12—Electric and Diesel-Electric Locomotive Facilities and Procedures

Report of Resolutions Committee



J. J. Schmidt (D&RGW)
Chairman



P. B. Burley (IC) Vice-Chairman



C. C. Elber, AAR Secretary

16

Roll Them Out Like New

Armature Finishing and Inspection

Let's look at some important finishing touches to be put on the rebuilt armature before it is assembled in the frame. Like the last strokes of a skilled artist, they may make the difference between success and failure for the whole job.

The ends of the armature coil leads projecting from the commutator riser should be removed. Turning in a lathe is preferable. Cut off only enough copper to clean up the vertical surface of the riser. Remember that the greater the riser width, the more rewinds the commutator will stand. On smaller armatures, the extensions are removed with a chisel and hammer before the armature is soldered. This is done because the coil leads may be so close together that solder fills the space between them. A solid solder ring can be formed which is hard to remove.

Part 16, in series covering maintenance of heavy locomotive electrical equipment, written by C. L. Hazen, Locomotive and Car Equipment Department, General Electric Company, Erie, Pa. A commutator is usually turned. This removes solder from the brush surface, and corrects for out-of-roundness, bad burning or pitting. It also reduces the amount of final grinding required. Turn off only enough copper to get a uniform, concentric brush surface. Use a sharp tool to get a clean, smooth cut without dragging copper over the side mica. If possible, turn the armature on its own bearings. Otherwise, hold it in lathe centers that are true with respect to the bearing seats. This will avoid ending up with a commutator that is out-of-round.

Copper wears faster than mica, so the side mica must be undercut. Amount of undercutting varies for different machines, and is given in the manufacturer's maintenance instructions. For a workmanlike job, select a sharp saw wide enough to remove all of the side mica in one pass. The copper segments will help steady the cut and eliminate mica fins which will spoil the brush contact. When finished,

inspect for mica fins and remove them. Undercutting can be done by hand, but a motor-driven saw does a more workmanlike and efficient job.

Commutator Finishing

For a proper commutator finish, the brush surface must be smooth, and concentric with the armature bearings. The best way to finish the commutator surface is to turn it in a lathe using a diamond tool, or to use a grinding machine, as shown in Fig. 1. When doing this, the armature should be mounted on its own bearings.

Take special care that no copper dust gets into the armature winding. Cover the armature with a cloth or use a suction attachment on the grinder. Also make sure the space between the copper segments and commutator cap is sealed at the outer edge so no copper dust or dirt can enter the gap and cause an insulation failure. Use an elastic sealing material that will not become hard, such as silicone putty.

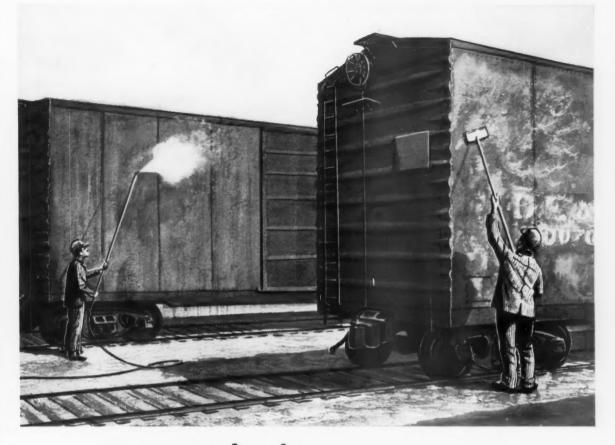
When grinding, always use a finishgrade stone to make the final cut. A low spot will show up as a shadow on the commutator surface each time the armature rotates. Watch the surface. When it looks uniform (no shadows) move the wheel back and forth without touching the feed before removing the wheel from the commutator. This takes out the high spots and scratches. To obtain the fine finish required on a commutator (about 32 microinch finish), polish the surface. This is done with very fine sandpaper, 00 or finer, or with 400A Triemite paper. After grinding, slivers and fine feather edges of copper often show on one side of each bar. Remove the defects by scraping a slight chamfer on this side of each bar. Be careful not to scratch the brush surface. Avoid the use of oils or coolants when machining a commutator. A very little of these may lead to commutation troubles or cause dirt to collect, resulting in flashover or ring fire. Cover the finished commutator with a piece of cardboard for protection against grease, dirt and scratches.

(Continued on page 81)



Fig. 1—Commutator grinding machine with suction hoses for removing copper dust.

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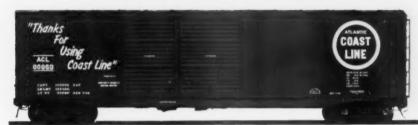
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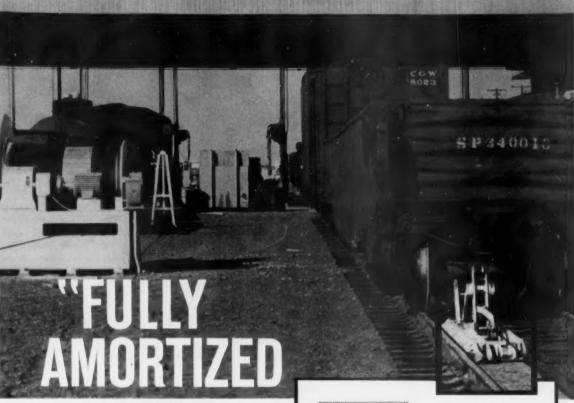
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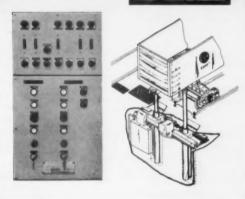
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Railway Maintenance Corporation

Pittsburgh 30, Pa.





System Covered by Patents Applied for



New KENDEX* tooling cut tool-cost-per-wheel 73% on one job —77% on another

Designed specifically for wheel turning, these new Kendex tools have proved their cost-cutting value—as detailed in the reports of two typical jobs.

The big factor is elimination of all regrinding, made possible by using clamped, turnover-type Kendex inserts that have eight indexable cutting edges. When an edge becomes dull, the clamp is released and the insert is given a quarter-turn to a new, sharp edge. It is then reclamped without disturbing the tool, so there is no need to reset or gage the tool. When each of the eight edges has been used, the insert is discarded and replaced by a new one.

A Kennametal* shim provides a solid seat for the insert—and when required, permits the use of harder, more wear-resistant grades of Kennametal. Chipbreakers of Kennametal provide better chip control and eliminate chipbreaker grinding.

For further information on how Kennametal tools can cut your costs, contact your Kennametal Representative or write for Catalog RR 259. KENNAMETAL INC., Latrobe, Pa. *Trademark*

Operation: Profiling tread and flange 40" diesel wheels on car wheel lathe at $\frac{1}{4}$ " feed and $\frac{1}{4}$ " maximum depth of cut

	Conventional Tooling	Kendex Tooling
Number of wheels (basis of comparison)	2710	1973
Wheels per edge	6	8
Time required to change tool	15 min.	5 min.
Cost of carbide only per set of wheels	\$.818	\$.312
Regrinding cost per set	\$.33	Not required
Carbide plus grinding per set	\$1.15	\$.312

Operational Data: Car wheel lathe, turning 33", 36" and 40" diameter wheels at 14 to 16 rpm, χ_6 " to χ_2 " feed, and χ_2 " maximum depth of cut

	Kennametal "H" type tooling with Kennametal K21 inserts	New Kendex tooling with Kennametal K21 inserts
Insert cost Insert regrinding cost	\$15.13 9.00 (10 regrinds)	\$4.03 NO regrinding†
Total insert cost	\$24.13	\$4.03
Wheels per cutting edge	6	6
Cutting edges per insert	(orig. edge + 10 regrinds)	8†
Wheels per insert	66	48
Insert cost per wheel	\$24.13 ÷ 66 = .366	\$4.03 ÷ 48 = .084

†Kendex tooling eliminates all regrinding

97260



KENNAMETAL ...Partners in Progress (Continued from page 74)

Now the armature looks like new. It is important to find out how good it really is and to record the final results. Before beginning tests, inspect the commutator carefully. Look for solder or copper bridging the side mica. Pay particular attention to the commutator riser area. Remove any solder beads or copper slivers. Examine the risers where the armature coil lead ends are visible to detect poor soldering. Next, apply bar-to-bar, surge, and "hi-pot" tests. Part 9 of this series gives details of these tests.

Use the bar-to-bar resistance test to check the armature for high-resistance connections and for open or short circuits. Then apply the surge test. Because of the higher bar-to-bar voltage, this test often detects insulation weaknesses not detected with the bar-to-bar resistance test. For reconditioned armatures, the surge voltage is usually lower than the original or new value to allow for aged insulation. Measure the insulation resistance before hipotting. Never "hi-pot" if the insulation resistance is low because the insulation may break down, resulting in a rewind job. On reconditioned armatures the hi-pot voltage, like the surge voltage, should be lower than the new value.

Unbalance shortens the life of bearings, commutator and windings. This is especially true in modern high-speed traction motors and generators. Any major repair work almost certainly disturbs the armature balance. Therefore, the armature should be rebalanced after overhaul if:

- It has been reworked or coils repaired;
 - It has been rebound;
- Commutator repair work (other than tightening, turning, or grinding) has been done. It is very important to dynamically balance the armature after banding. If the outside varnish has been applied evenly and no other major repair work has been done, dynamic balance may be omitted.

Dynamic Balancing

As pointed out in Part 14 of this series, a part may be statically in balance but dynamically out of balance. Certain low-speed parts, such as fans, which have weight concentrated in one plane, will operate successfully if balanced statically, as indicated in Fig. 2A. Dynamic balance is required, however, if the weight is distributed

along the axis of rotation as in an armature.

Suppose weight A, Fig. 2B, represents the armature unbalance. Adding weight F will give static balance. The centrifugal forces of A and F, however, will cause the ends of the armature to wobble, as shown. The armature is dynamically unbalanced. Adding weights B and C in planes X and Y will introduce a moment equal and opposite to that of the original weights A and F. The armature will then be in dynamic balance.

The two planes chosen for adding balance weights are usually at the ends of the armature. They should be located at the largest diameter as far away from the weight centerline as possible. Less weight is then required. Therefore, armatures are usually balanced on the largest diameter of the armature head at the rear of the core

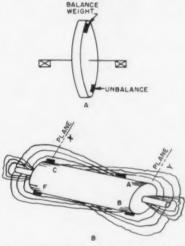


Fig. 2—Illustration of (A) static and (B) dynamic balance.

and on the largest diameter of the commutator cap.

Balancing machines are based on either mechanical, electrical, or optical principles. All three types use the same basic procedure. Only one end of the armature is balanced at one time. On mechanical or optical types the armature is supported on a pivot and the opposite end is allowed to vibrate. The electrical type does this in another way by switching circuits from one end of the armature to the other. Modern commercial balancing machines determine the position and size of the balance weight automatically.

If a repair shop cannot economically justify purchasing a balance machine, a simple mechanical balancing machine, as shown in Fig. 3, can be constructed. The lighter the machine the more sensitive it will be to vibration. The unbalance in plane X is measured by the amount of vibration caused in the cradle. No vibration is found in plane Y because it is supported by the fulcrum. When the fulcrum is moved to plane X, the unbalance in plane Y is recorded.

This machine operates as follows: Assume that plane X is the commutator end. Chalk in four positions 90 deg. apart on the commutator cap and number them as shown in Fig. 4. Use a weight of approximately the amount of unbalance expected. Record the vibration with the weight attached to each of the four positions. Suppose the dial indicator readings in thousandths of an inch are: 16 at 0 deg and 360 deg, 5 at 90 deg, 6 at 180 deg and 17 at 270 deg. Draw a graph of magnitude and position as shown in Fig.

(Continued on page 84)

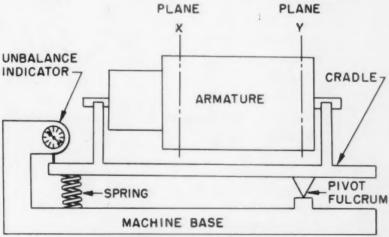


Fig. 3-Simple machine for dynamic balancing.

ECONOMICAL AND DEPENDABLE

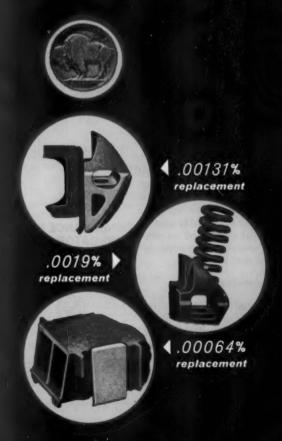
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(Continued from page 81)

4. This will indicate that the weight should be placed at 130 deg.

By slightly varying the size and position of the weight, you will quickly get the best location and size. Weld or rivet the weight in place. Move the pivot fulcrum to plane X or turn the armature around and repeat the process for the other end. You may find after the second end is balanced that the weight on the first end must be changed or moved a little.

Here are some helpful tips on dynamic balancing. In using an electric balancer, it is only important to run the armature at some arbitrary speed below its critical speed. When using a mechanical type balancer, try to run the armature at the speed that produces maximum vibration. This may not be possible if the armature is badly out of balance because it would wobble too much. In that case, balance the armature at a speed which gives a safe vibration level. If the armature has a removable fan, balance it with the

fan attached. The relative position of the fan on the armature should be marked so it can be reassembled the same way each time and retain correct balance.

Spin Seasoning

A major overhaul usually disturbs the position of the commutator segments so the commutator should be spin-seasoned after the armature has been repaired or rewound. This allows the copper segments to resume their correct position during the seasoning and not after the armature is in service. The elements of speed, temperature, time and pressure to tighten the commutator vary for different machines, so always refer to specific instructions.

The string band is an important part of the machine's insulation system because it provides an easily cleaned creepage path between the commutator segments and steel. A good grade of cotton twine is recommended for the string band. Cotton resists flashovers much better than glass. If glass is used, it will melt and char when a flashover occurs. Then a ground failure is likely to develop.

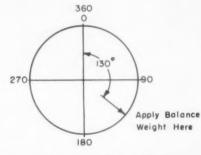
Over the years, different sealing materials have been used for string bands. Epoxy, one of the newest, has excellent moisture resistance. Whatever material is used, apply enough on the mica cone in the area to be cord bound to squeeze up between the turns of the cord. This fills the voids. Wind the turns as close together as possible, then brush another coat of sealing material over the coard. After the sealer has been baked and is hard, sand the surface smooth and apply some arc-resistant, high - temperature varnish. Check to see that there are no exposed strings, voids or large blisters and that the surface is smooth enough to be easily cleaned. Time can be saved by applying the string band before the armature receives its varnish and is baked.

If the armature is going to be transported and handled before assembly, take one of two precautions. Remove the bearings and reinstall them when the armature is assembled in the frame, or hold them firmly in place so the outer race cannot move on the inner race. Lateral movement of roller bearings will skid or cock the rollers on the inner race and scratches or nicks can occur.

Inspection

The reworked armature looks great. But you should inspect it once more and check it off your records. While complete and accurate records are always important, here they certainly are a "must." Is the soldering job OK? Banding tight? Banding too high? String band tight and smooth? Armature slot wedge height OK? Width of mica slot correct? Mica slivers all removed? Depth of mica undercut correct? Commutator finish OK? (If questionable, compare with surface blocks or check with a profilometer.) Bearing inner races brinelled? Pinion fit on shaft too rough? Recesses in armature free of chips, dirt, etc.? Balance weights welded properly? Did weld splatter damage the armature coils? All the bolts in place, tight and locked?

If the armature passes this "final examination" it is ready to "graduate" and go on to final assembly and running tests.



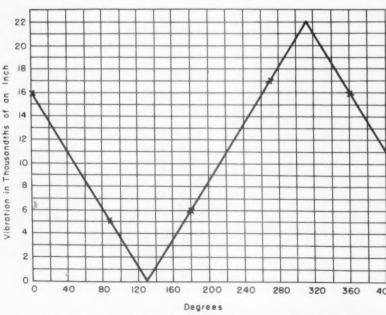


Fig. 4—Sample of chart showing location of weight for dynamic balance.

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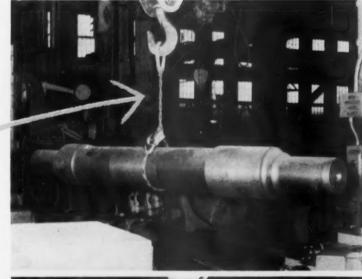


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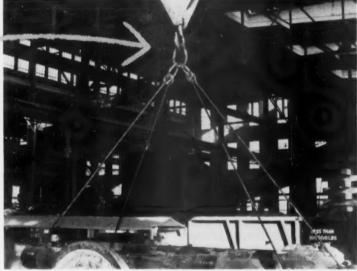
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Doc Bets on a Giraffe

By Gordon Taylor

Recently Engineman Murphy frequently operated the same four F7 dinsel units coupled in multiple. Each time he filed a work report on the operation of the ground relay on the A unit 5400. The trouble did not occur under all conditions, but it was annoying to have the engine speed suddenly drop to idle. After the ground relay was reset, the train could usually proceed without further trouble.

This condition had been reported several times to the maintenance force. Each time they checked the power circuits for grounds while the unit was in the shop. This continued for some time, along with the regular reports from Murphy. The boiling point of Murphy's temper was pretty low, and he decided to call on Doc Watts, ace trouble shooter at the diesel house.

"Doc," he started, "I used to think your fellows were pretty good trouble shooters, but their recent performance has changed my mind. Right now, I would bet they couldn't find a giraffe in a strawberry patch."

"Well," answered Doc, "you just issued a challenge that I will accept. We'll try to get in your good graces once more. Often it's difficult to duplicate good road operating conditions in a diesel house, so you'll have to help us as much as you can. Let's talk about this locomotive.

"Does ground relay action seem to be connected with some special operating condition? For example, does it occur when you are operating in transition 1 or 2, or does it happen more often when traction motors are hitched in parallel—transitions 3 and 4?"

"Now that I come to think of it," replied Murphy, "it does seem to occur when the motors are in series or in series-parallel—transitions 1 and 2. Sometimes I have thought we were having wheel-slip trouble, but it turned out to be ground relay trouble. Even then, the trouble was of the 'come and go' type; doesn't continue."

"Thanks," Doc replied. "You have at least narrowed our field—put us



in the right berry patch, so to speak. We'll do our best to find the trouble this time."

Doc called in two of his best electricians and told them of Murphy's complaint. "This is a case where we will have to use our imagination a bit to see what we were not testing during our previous checks when the 5400 was standing in the house. Apparently, there was something not in the circuit when we got the 'all clear' signal on our earlier ground tests. Let's start from scratch and see what we dig up.

"Looking at a schematic wiring print for an F7 unit, I can see it would take the closing of the S14 contactor to set up circuits through traction motors 1 and 4. It would also take a closed S23 contactor to close the power circuits through traction motors 2 and 3. I don't expect that the closing of power circuits will reveal anything new in this case. But, the \$14 and \$23 contactors have some interlocks which, when closed, may bring in circuits that may not have been closely checked before. For example, the circuit through the voltage coil on the wheel slip relay will not be completed until the series power contactor closes, closing the EF interlock. Let's start by blocking the S14 contactor closed (with the power off, of course) and make a test for ground."

To their amazement a ground indication appeared. When the S14 contactor was opened, the test showed no ground. It was apparent that the

wheel-slip-relay coil was involved in some way. If there was a ground in its coil, why would there be no indication on the ground-testing instrument, regardless of whether the EF interlock was closed?

"This calls for a close examination of the voltage coil in the WSR1 relay," Doc explained.

When the coil was checked closely, it was found to be burned in two. One portion of the burned coil was free of ground, but the burned end of the other section of the coil was grounded to the relay frame in such a way that it established a circuit through the ground relay. There was no contact with the high-voltage system until the EF interlock of S14 was closed. No wonder the maintainers missed the fault on their earlier tests. In addition, the contact made by the burned coil was not positive, so that only at times would it ground. The trouble was completely cleared when a new voltage coil was installed in WSR1 wheelslip relay.

As Doc said, "This is a most unusual case. Who would ever think of a ground condition that could hide like this?" It took the combination of a coil burned in two with half grounded to the high-voltage circuit only when a power contactor was closed. To further complicate the situation, the ground was intermittent.

While we are talking about it, let's consider the interlocks that S14 operates. It has three pairs. Interlock AB energizes power contactors P1 and P4; interlock CD energizes 'SH' shunt field contactor for the main generator, and interlock EF closes the circuit through the voltage coil of the wheelslip relay.

"This wraps up our case," Doc said, "and we can tell Murphy that we have found his giraffe, even though it was well concealed."

This case seems to prove our point—it requires real teamwork and a free exchange of information between enginemen and maintenance crews to achieve best results. Sometimes a bit of information that the crew thinks is unimportant provides just the clue that the trouble shooter needs.

This series of articles is based an actual experiences of men who operate and maintain diesel-electric locomotives.

ACL Coded Repairs

(Continued from page 59)

Code 162-25 to 162-32. Application of from one to eight new 11-in. journal bearings, reasons same as for items 162-1 to 162-8.

Code 162-A-1 to 162-A-8. Application of from one to eight new 8-in. journal bearings in conjunction with associated repairs and because bearing or bearings are worn out.

Code 162-A-9 to 162-A-32. Application of new 9-in., 10-in., 11-in. bearings for reasons given for items 162-A-1 to 162-A-8.

Code 162-C-1 to 162-C-8. Application of from one to eight 8-in. new journal wedges without associated repairs and only because others were worn out.

Code 162-C-9 to 162-C-16. Application of second-hand 8-in. wedges for same reason listed for items 162-C-9 to 162-C-16.

Actually, these typical journal codes continue through 162-D-64 covering materials involved in 194 possible operations involving replacement of varying numbers and sizes of wedges.

Each repair track and AAR billing department was provided with a mimeographed list of the repair codes before the new system went into operation so those who would prepare and handle the billing repair cards could become familiar with the new set-up. Associating the code numbers with item numbers and page numbers of the interchange rules makes it easy to verify that operations are being correctly shown in accordance with AAR rules.

Next, the bad-order card was revised so that the front side would carry the same information as previously with respect to bad-ordering of cars. On the back side, the ACL has listed those repairs most commonly made on repair tracks to freight cars, leaving columns for location, number of items, weights, and code numbers, along with additional space for repairs not listed.

The car inspectors, as they have in the past, simply fill out the bad-order side of the card with the train number, date, defect for which the car was badordered, initial and number of the car, and signature of the inspector.

Once the bad-order car is switched to the repair track, the carman, under the direction of the foreman, removes the bad-order card and makes a thor-



Today...automation has truly entered the railroad cleaning field. Through the miracle of "silent sound," Turco's new Ultrasonic Cleaning Process accomplishes automatically in one short minute what used to take manual labor a full half hour of tedious hand work. Moreover, with Turco Ultrasonics on the job, cleaning is more complete and is accomplished in even the most inaccessible recessed areas. For example, when utilized to clean air brake valves, the new Turco process simultaneously removes grease, oil and carbon, brightens the brass valves, and frees rings

and valves for ease and economy of subsequent dissassembly.

AVAILABLE FOR ANY NEED

Turco Ultrasonic Cleaners now in actual use by railroads range from small bench models all the way up to the custom-engineered, conveyorized 100% automatic "push button" installations for central overhaul depots.

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No need for employees to touch the cleaning solutions or solution-covered parts. Eliminates mess and reduces hazards in manual cleaning areas.

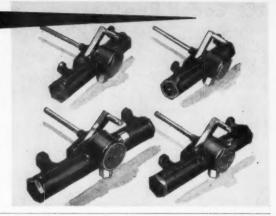


27 YEARS IN SERVICE!

these Sprague AIR-Pusa Windshield Wipers are now ready for more!

The four Air-Push "Standard" Series wiper motors shown are 27 years old, work on Pullman Company yard locomotives. They were returned for factory overhaul (at approximately \$10 each)-restored to new condition and put back to work. Need more be said?

> Safety Starts with Seeing! MICHIGAN CITY, INDIANA



ough inspection of the car, listing on the back the code numbers of the repairs that are to be made and checking the item of repair. The bad-order card then becomes original repair record.

The bad-order card remains with the car while it is on the repair track. The supervisor checks this original record of repairs against the work actually performed to determine that all repairs have been made in accordance with AAR rules and that correct code numbers are shown. The bad-order card then goes to the car foreman's office at the repair facility.

If wheel changes are involved covering multiple-wear steel wheels, a small form is completed which shows the service metal in the wheels removed and applied. This form is attached to the original record of repairs and is held at the repair point for wheel-shop information.

The bad-order card, or the original record of repairs, is again thoroughly checked before it is sent to the Coast Line's AAR billing office. The AAR Bureau has a supply of preprinted billing repair cards indicating the repairs that have been made by code numbers and with prices included. The original record of repairs is examined at the AAR Bureau and those preprinted billing repair cards are selected which correspond to the code numbers shown on the original record of repairs.

Accuracy of the code numbers is verified by the AAR Bureau before the preprinted billing repair card is completed by filling in the date, location, and initial and number of car. The billing repair card is made in duplicate and a copy is attached to the bad-order card (original record of repairs) and returned to the repair facility for filing.

record of the bad-ordering of each car and the repairs made, starting from the time the car was picked up by a car inspector.

By using the coded repair system, it is simple for an untrained clerk in the AAR Bureau to secure the correct preprinted card. Formerly, these clerks had to be specially trained.

On repair tracks, carmen memorize

most of the code numbers covering repairs normally made. This speeds the handling of the billing repair cards there. Cards are then in a form which allows them to be processed rapidly at the AAR Bureau. Next step, if the system receives AAR approval, will see the Atlantic Coast Line processing its billing repairs on its IBM accounting machines.

			ATLANTIC COAST LINE SHOP TRACK INSPECTION					
TE			PLACE	()	.1	(#)	INSPECTED BY	
R NO.			INITIAL	K	IND		INSPECTED BY	
			DEFECT SYMBOLS			NCILED FO	R WHEEL	
0. 1			W.O. 3 DEF. 8				RORR YES	NO
. 2			MISS 4 - TYPE TRUCK-UNIT- NON Y				BS. YES	NO
			REPAIRS MADE					
	NO.	NEW		SIZE	DE-			
oc.	PCs.	811	ITEM	WT.	FECT	CODE		REMARKS
			AIR BRAKES - COT+5 - 10T				OLD DATE	
			AIR HOSE - SL ANGLE COCK - WE ANGLE					
			COCK - TR LINE				SL OR WS REM	
			BRAKE BEAM NO. 18 -HGR, -HANGERLESS					
			BRAKE HANGER - PIN					
			BRAKE LEVER - RODS - PINS					
			BRAKE SHOES - KEYS					
			C.I. SHIM - FIG. NO.					
			COUPLER - YOKE					
			CARDBOARDS					
			DOOR REPAIRS					
			DRAFT GEAR + ATTACH.					
			DUST GUARDS					
			HAND BRAKE					
			JNL. BEARINGS					
			JNL. WEDGES					
			JNL. BOX - LIDS					
			LADDER - HAND HOLD - SILL STEP					
	-	-	PIPE FITTINGS				-	
	-		RELEASE LEVER - UNCOUP.					
	-	-	REPACK BOXES - R68		-		OLD DATE	
		-	WASTE OR TYPE LUB.		-		TYPE LUBS.	
	-	-	RUNNING BOARD	-	-			
_	-	-	SAPETY SUPPORTS	-	-	-	-	
	+	-	SPRING PLANK	-			+	
	+	-	TRUCK SPRINGS-GROUP - PLATES-SHIMS	-	-	-	+	
	-	+	DC OC IC	-			DC OC	1C
	-	-	WHEELS- KIND KIND	+	-		KIND	KIND
	+	+	NO'S OUT IN	+	+		NO'S OUT	IN
_	-	+	NO'S OUT IN	1	1		NO'S OUT	IN
-		-	AXLE	1	-		-	
		+	OTHER ITEMS	1	+		+	
		1	1	1	1	-	1	
			1	1	1			
				1				
				1	1			
				1				
			1	1				

Back of the bad order card is printed to be the original record of repairs. When folded, this card The coding system gives a complete is the size of standard bad order card used by all roads.

(Continued from page 20)

to withstand severe stresses. The battery has a corrugated, perforated polyvinylchloride separator, as well as a microporous rubber separator between positive and negative plates.

The Edison pocket-cadmium storage battery is for low temperature applications in emergency power systems, and signal equipment. It is an alkaline type battery constructed of high-strength, lightweight nickeled steel. The tubular positive plate, a feature of the Edison nickel-iron battery, consists of perforated steel tubes containing nickel oxide and thin nickel flake in layers. Thomas A. Edison Industries, McGraw Edison Co., Dept. RLC, 189 Main st., West Orange, N.J.



volt constant wattage or reactor ballast. The luminaires are furnished for use with or without a photoelectric control and accommodate clear or color-improved mercury lamps rated through 400 watts.

Post-top luminaires for yard, driveway, and roadway lighting may be used with incandescent lamps rated through 10,000 lumens, or with mercury vapor lamps rated through 250 watts.

A four-lamp fluorescent luminaire is equipped with a Peltier thermo-electric heat pump. The light output of the luminaire at 77 deg F ambient temperature is said to be 72 per cent higher than for the same luminaire without a cooling device. The Peltier device cools a very small area on the lamp-bulb wall, maintaining the mercury vapor pressure within the lamp at the optimum value for maximum light output. Line Material Industries, McGraw-Edison Co., Dept. RLC., Milwaukee 1, Wis.



Battery Charger

A battery charger, developed specifically for the new PFE refrigerator cars, will accept voltage inputs from 150 to 300 volts at 40 to 80 cycles. This is compensated for automatically, requiring no mechanical adjustments. The output is pulsed from ON to OFF between 13.5 and 14.5 volts, with no trickle charge occurring between these points. This feature makes the unit particularly adaptable for use with nickel-cadium batteries. Vapor Heating Corp., Dept. RLC, 6420 West Howard st., Chicago 48.

Outdoor Lighting

Four new luminaires are available for yard, roadway and driveway lighting. The one-piece Suburbanaire, Line 3Cl for yard lighting, can be had with or without photo-electric control. It will accommodate medium or mogul base incandescent lamps in sizes through 405 watts. The head and reflector is an integral upper assembly formed of aluminum.

Line 2A2, for highways and parking areas, is equipped with an adjustable mogul socket, a one-piece heat-resistant glass reflector, and a 120/240, 277, or 240/480-

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Stripping the Newer Finishes?

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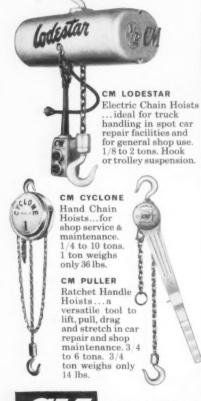
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EQUIPMENT . CHEMICALS . METHODS







HOISTS

Send for Bulletins and name of local distributor

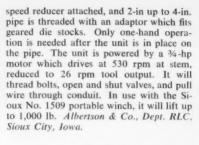
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Columbus McKinnon Chain Corporation
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quality, dependability and safety for more than 75 years



Stainless-Steel Manifold

The Model 605 manifold for the 16- cylinder Alco engine is made of high-temperature stainless steel. There are 27 bellows, with machined slip joints inside each bellows which are designed to keep turbulance at a minimum. The manifold is constructed to correspond to the firing order of the engine, permitting a smooth, gastight flow to the turbocharger with a minimum of back pressure. All sections are sized and butted to the preceding section before being Heliarc welded in an inert atmosphere. Hanlon & Wilson Co., Dept. RLC, 321-325 Pennwood ave., Pittsburgh 21, Pa.





Journal Roller Bearing Puller-Installer

The Y4600-A is a portable, hydraulically operated machine for removing and installing axle journal roller bearings quickly and easily, without removing wheels and destroying wheel fit. The 100-ton capacity machine is designed to remove and install Timken and Hyatt locomotive and passenger-car roller bearings as well as Timken heavy-duty Type AP roller bearings, Hyatt Hy-Roll Taper freight-car roller bearing insersleeve in SKF locomotive, passenger-car and freight-car roller-bearing assemblies.

The machine is compact, lightweight, and can be operated by one man. The pulling-frame centerline adjusts from 14 in. minimum to 28½ in. maximum from the floor. Double-acting hydraulic ram with full 15½ in. stroke is powered by two-stage Vanguard hydraulic pump. The steel frame is mounted on rubber wheels. Owatonna Tool Co., Dept. RLC, 682 N. Cedar st., Owatonna, Minn.



Journal Lubricator

The core of the Karpak one-use lubricator is a one-piece nitrile rubber foam with three internal helical springs held in place by non-ferrous caps. This combination is said to permit high oil retention, good baffling of oil, and permanent resiliency. The lubricator, which utilizes the chenille lock-stitch, has been submitted to the AAR Laboratory for test. Miller Lubricator Co., Dept. RLC, 1150-1200 East Eighth st., Winona, Minn.

Products of Non-Exhibitors



Portable Power Pipe Threader

The new Sioux portable power pipe threader weighs only 20 lb. It threads ¼-in. to 1-in. pipe in 20 sec with direct drive; 1-in. to 2-in. pipe in 1 min 24 sec with a

Rust Preventive Coating

No-Ox-Id "AZ", a metallic pigmented coating, incorporates a specific vehicle for spray application. It penetrates and loosens slab rust and curled paint, then dries to a silvery finish to give long-term chemical and mechanical protection to exposed metallic structures under severe corrosive conditions. Only spot touch-ups are required to maintain the structure after original application.

Analysis of test results are said to show an average saving of 60 per cent over conventional painting. The coating can be applied to a painted surface with only limited surface preparation. After loose rust and other extraneous material have been removed, the coating will adhere well to the old surface and dry to a firm finish that can be permanently stenciled. Dearborn Chemical Co., Dept. RLC, Merchandise Mart, Chicago 54.



Oil-Level Gauge

A quick look at an easy-view control panelmounted, Sure oil-level gauge tells how much oil there is in the crankcase of any type combustion engine—gasoline or diesel. The gauge operates on engines with either 6- or 12-volt systems, or on 110-volt systems with transformers. It consists of a cork level contained within a tubular steel casing. The casing is mounted directly to the side of the crankcase. A small hole is bored in the crankcase to permit oil to flow into the casing and actuate the cork float which will rise or fall to the exact level of oil in the crankcase. The level of the oil is registered on a meter, calibrated in quarters. The meter is wired to the ignition and the cork level. When the ignition is turned on, the needle on the meter records the level of oil. Sure Gauge & Lock Co., Division of Waterworth Engineering, Dept. RLC, 2329 Troy st., Dayton, Ohio.

Spark Arrestor

A vane type spark arrestor, adaptable to mobile and stationary internal combustion engines, employs a centrifugal action principle without the use of moving parts. As the exhaust stream flows through the unit, the stationary vane imparts a spinning action to the air flow. This rotary motion drives the heavy particles of hot carbon to the outside of the stream and into the spark trap. The straight flow action of the muffler places minimum back pressure on





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Portable air-operated bearing lubricators for use with original 120 lb. drums and hand-operated bearing lubricators that dispense right out of original 25-40 lb. refinery pails are also available from Graco. For complete information, write to the address below.

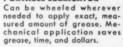
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HAND-OPERATED ROLLER BEARING LUBRICATOR

Ideal for servicing roller bearings while cars are in the yards. Keeps lubricant clean from refinery to bearing.







AIR-OPERATED STATIONARY LUBRICATOR Assembly includes air-powered

assembly includes air-powered pump, drum cover, follow plate, air supply screen, air regulator with gauge, material hose, and control valve with one quart meter.

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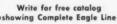
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1 qt., 2 qt., 1 gal. sizes with trigger-grip handle . . . 2½ gal., 5 gal. sizes with free-swing handle . . . valve operated by handle gives positive pouring control . . . no waste, no splash, no spill . . . strong quality construction.

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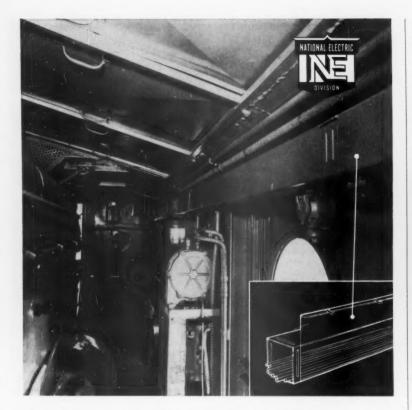


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National Electric "Wirewa" has been selected by the Baltimore & Ohio Railroad to replace electrical conduit as part of its diesel modernization program. Convenient, easily accessible "Wirewa" is an enclosed metal housing for wires and cable. Cable changes and additions are readily made. Spring-latched covers can be quickly opened for inspection at any time.

NE Conduits for take-offs are also supplied the B&O heavy repair shop at Glenwood, Pa., where eight engines a month are rebuilt or modified. Neoprenerubber covered wire in sizes from #16 to 777,000 CM completes the National Electric picture of a single convenient source for all types of railroad electrical distribution supplies.

Write for complete information on how National Electric can give you better materials and better service in your electrical repair programs. National Electric Division, H. K. Porter Company, Inc., Porter Building, Pittsburgh 19, Pa.

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the engine. The trap can be cleaned by opening the cleaning port with the engine operating at idle speed.

The arrestor has passed a variety of tests, including the U.S. Department of Agriculture, Forestry Service, test specification. Standard models, in aluminized steel with cast, ductile iron vane, may be had in four sizes to fit engines from 150 to 1,200 cu in displacement. Air-Maze Corp., Dept. RLC, 25,000 Miles Road, Cleveland 28.



Glass Fiber Air Filter

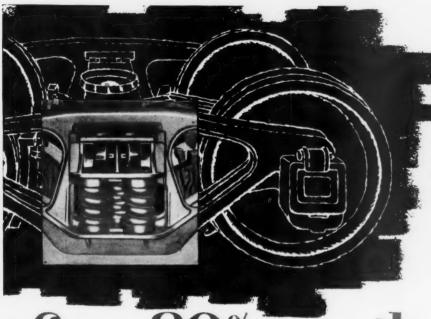
The Amer-kleen disposable glass-fiber air filter is designed to replace the permanent washable metal panel and oil-bath filters for diesel locomotive engine intake, car body and main generator applications. It is said to be less expensive to replace the glass fiber pads at regular service intervals than to wash and re-oil the metal filters. The filtering media has progressively increasing density from air inlet side of pad to the air outlet side, permitting the filter to trap dust and dirt in every part of the pad. According to the manufacturer, laboratory tests have proved the filter permits only half as much dirt to enter the locomotive as do permanent metal filters.

The pads are made from continuous interlaced fibers, assuring high tensile strength and eliminating the possibility of glass particles blowing out into the engine. A special gel adhesive coating retains dust and other loose materials. The filter pad is white, with the air outlet side colored yellow to insure application in the proper direction. The pad is held in place by a retaining frame, made in 2-in. and 4-in. depths in all standard sizes. Retaining frame conversion kits and permanent installation kits are available. American Air Filter Co., Dept. RLC, 215 Central ave., Louisville 8.

Dielectric Tester

The Ceqco Model 1050 dielectric and relay setting instrument is fully portable and requires only minutes to set up and make test. It is powered by diesel locomotive battery (32, 64, 128 volts) and can be used anywhere, regardless of locomotive loca-

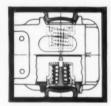
(Continued on page 100)



convert old freight car trucks to high speed service this money-saving, cost-cutting way!

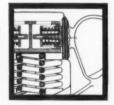
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There's no need to let those serviceable old Freight Car Trucks be limited to slow speed service when you can convert them to profitable operation at a fraction of the cost of new trucks...The Holland Ride Stabilizer RS-2 has proven to give the same high-speed, lading-protecting, easy-riding characteristics you get in new, costly freight trucks.

You can convert any bolster of A. A. R. approved design and stabilize the ride laterally, vertically and longitudinally...The direct spring loaded control system of the Holland RS-2 does not cause uneven wear of the Journal Bearing when abnormal forces are exerted. Wedge made pressures just do not occur. Installation of the RS-2 components is unusually simple...And Holland Engineers

will give you on-the-job assistance.

Write or call for the new Tell-All Bulletin RS-2.

RS-2 Spring cushioned pressures do not disturb load distribution on the journal.

Wedge made pressures disturb load distribution on the

Holland Volute Snubber Springs



Either 2½" or 1%" Spring Travel.

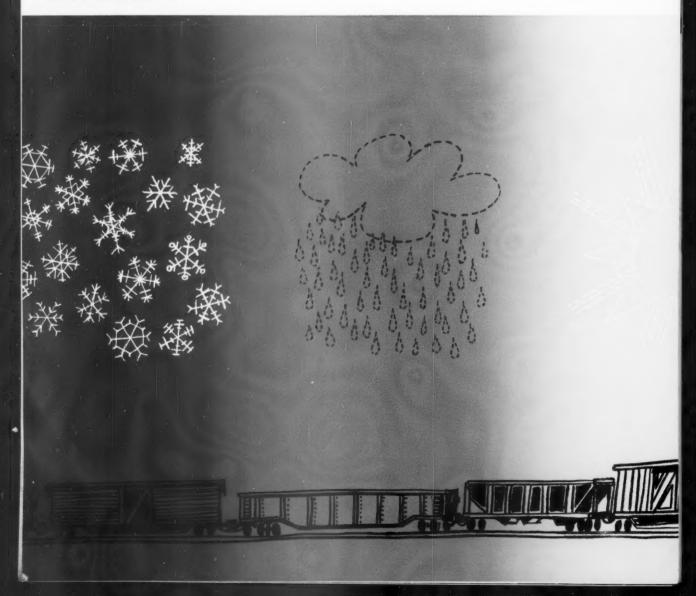


STYLE E-2 Volute Snubber Spring, 2½" Travel in 50 Ton Group.

Upgrades ride by introducing an unusually smooth snubbing action with an exceptionally high load carrying capacity. Holland's principle of utilizing the sliding action of telescoping radially compressed coils with ample friction area eliminates the "bombarding" problem.

518R

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- While June is bustin' out all over, it will come as no surprise to any railroader that *metal brake shoes* weathered the rigors of one more bad winter.
- Metal brake shoes have set a standard for reliability in railroad braking that can be taken for granted. They have been taken for granted because metal is such a remarkably suitable material for doing the job under adverse conditions. With metal brake shoes there is no "maybe" in your ability to stop and your ability to control train speed. This reliability is available with metal brake shoes regardless of weather conditions. Safety demands such reliability.

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* HENNESSY LUBE-PAD-13

The Hennessy Lube-Pad-13, now AAR conditionally approved effectively meets the need for a dependable, long life, high quality pad that will constantly provide top lubrication.

Designed to follow the contour of the box, Lube-Pad-13's soft pliable construction affords maximum contact with minimum pressure against the journal. Multiple fold design provides voluminous oil to the journal at all times under all conditions. Neoprene foam core retains from four to five pints of oil in addition to the free oil in the box. Short pile cabled yarn, specially twisted, resists adherence to the journal even in cold weather . . . this feature virtually eliminates pad shifting in the box.

The Hennessy Lube-Pad-13's practical design and rugged construction of heavy duty materials provides exceptionally long pad life retaining original qualities even after several renovations.



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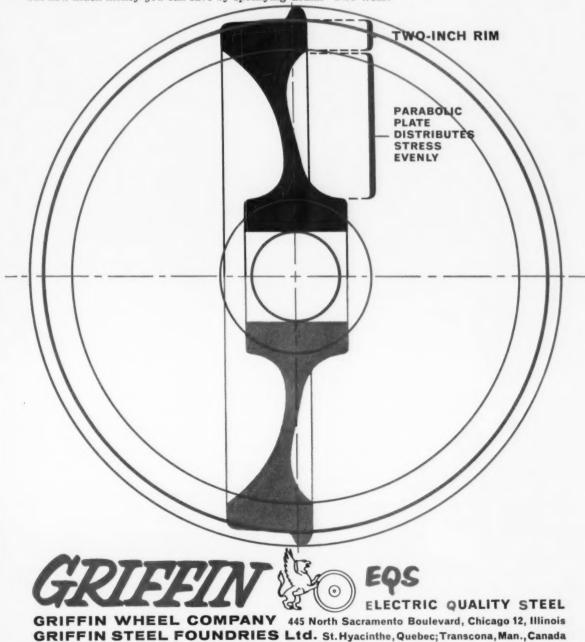
MAKERS OF LUBRICATORS FOR ALL JOURNALS OF RAILWAY EQUIPMENT

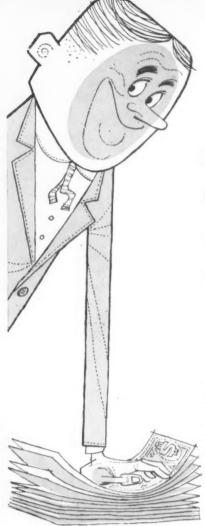
GRIFFIN "TWO WEAR" WHEEL NOW APPROVED BY AAR

Developed to meet the grueling demands of high mileage freight cars, Griffin's "Two Wear" Wheel has been approved for application to 50- and 70-ton cars by the AAR.

Bonus feature Number One: the "Two Wear" Wheel is a *multiple-wear* wheel that can be "turned" several times. (You're assured of at least two full turns, regardless of flange wear.) The wheel has a two-inch rim, with one-wear tread and flange design, and is cast to within 20-thousandths of an inch dimensional tolerances.

Bonus feature Number Two is the parabolic shape of its plate—scientifically designed to minimize concentration of stress by distributing stress evenly. Call your Griffin Representative today and find out how much money you can save by specifying Griffin "Two Wear."





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tion. For relay testing and setting, connect output leads across the transition relay coil to measure voltage and current as required. Central Equipment Co., Dept. RLC, 80 East Jackson Blvd., Chicago 4.

Supply Trade Notes

(Continued from page 15)

tively. George A. Legath appointed assistant to general sales manager at Milwaukee, Wis.; Carl V. Barnes, sales engineer at Milwaukee, and the Bowman Supply Co., sales representative at Cleveland.

AMERICAN MARIETTA CO. — James Chemical Co., 154 East Erie st., Chicago, appointed distributors of adhesives and chemical coatings to railroad industry for the Presstite Division of American Marietta.

FAIRBANKS, MORSE & CO. — Robert Aldag appointed manager of locomotive product sales. Mr. Aldag formerly manager, Railroad Division. Hugh Donaldson appointed central regional manager, and E. J. Phillips appointed eastern regional manager, locomotive product sales, with headquarters, respectively, at 1550 South State st., Chicago, and 19-01 Route 208, Fair Lawn, N. J.

GENERAL AMERICAN TRANSPORTA-TION CORP.—T. M. Thompson, vicepresident in charge of tank car leasing division, elected president, succeeding W. J. Stebler, retired.

MONTREAL LOCOMOTIVE WORKS.— William F. Lewis, executive vice-president, named president.

SPARTON CORP.—Charles R. Lewis appointed manager of sales.

ENTERPRISE RAILWAY EQUIPMENT CO.—Harry A. Withall elected president, and Harold Harris vice-president.

STANRAY CORP.—Stanray is the new corporate name for the former Standard Railway Equipment Manufacturing Co.
(Continued on page 103)



"precision must apply to planning, too!"

says FRANK E. CHESHIRE, Manager of Sales Railway Division, International Steel Co.

"Objective planning is more than a trend-today freight carrying rolling stock needs to be designed to a purpose.

"Shipper requirements, increasingly wide variety of lading characteristics, mushrooming development and adaptation of loading, stowing, and discharging methods and appurtenances, the premium on

time, and overall shipping costs, all dictate purposeful design.

"When we started fabrication of freight car components at International Steel, our aim was to put *precision* into the design and construction of the freight car.

"Our achievements in this direction over the past ten years have been very gratifying to our customers as well as to us.

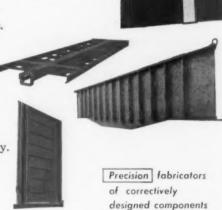
"But our aim to achieve precision in design as well as construction has led us along many paths.

One of the chief elements of design (and indeed, one of the conditions for success in any undertaking) is definite purpose.

"An 'all-purpose' freight car is a 'no specific purpose' car for which plans are generalities.

Result: limited adaptability and idle car days.

"At International Steel we plan objectively. Give us your most demanding purpose and let us put precision into its plan."





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These men are specialists. Their sole purpose is to make Farr Company as useful and helpful as possible to the expanding railroad industry.



G. K. (George)
Raider: Central
District Sales Engineer. Many years
experience serving
the Railroad industry with Pyle National Company.

Farr customers will use these men to get jobs done easier, faster, better...and to get maximum use and benefit from the broad line of Farr air filtration products for railroads.



C. C. (Cliff) Mugford: Western District Sales Engineer. Many years experience with Southern Pacific Railroad, Union Oil Company.

These men are experts. They will help Farr Company translate new industry needs into new products ...fine products which will contribute to industry progress.

Farr Company Airport Station — Los Angeles 45, California (Continued from page 100)

UNITED SHOE MACHINERY CORP.— John M. Jurist appointed district manager, West Coast area, and Henry M. Heitman sales engineer, North Atlantic territory, Pop Rivet Division.

SERVO CORP. OF AMERICA.—Sanford H. Steward, Jr., appointed district sales manager, railroad products, Central region of the United States.

LUMINATOR, Inc.—Walter F. Gips, Jr., vice-president, elected president. William Merlin Adrian appointed vice-president, design and engineering.

VAPOR HEATING CORP.—Philip A. Scheuble, Jr., elected a vice-president. Mr. Scheuble will continue also as general manager of Vap-Air division.

ANACONDA WIRE & CABLE CO. — E. J. I. Davies appointed manager - railroad sales at Chicago.

DEARBORN CHEMICAL CO.—Glen R. Pierce appointed manager, newly created distributor sales division, Chicago.—An Indiana-Michigan district office opened at 3001 Fairfield ave., Fort Wayne, Ind., T. J. Weisbruch district manager.

CONTINENTAL COATINGS CORP. — Walter G. Fortune appointed manager, diesel applications.

WAUGH EQUIPMENT CO.—W. K. Durbon, vice-president, appointed sales manager of newly formed Cushion Underframe Division of company, with headquarters in Chicago. F. A. Bussman, service man, assigned to Underframe Division as assistant to Mr. Durbon, operating out of Pittsburgh, Pa.

ALCO PRODUCTS, INC.—New York address now 530 Fifth ave., New York 36.

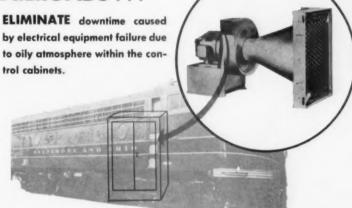
TIMKEN ROLLER BEARING CO. — W. R. Timken elected president, succeeding D. A. Bessmer who resigned recently because of ill health.

GRIFFIN WHEEL CO. — Franklin M. Finsthwait appointed district sales manager. Mr. Finsthwait had been representing Griffin through Seaboard Sales Corp. which he formed in 1956 to represent manufacturers in railway supply field.

ELECTRO-MOTIVE DIVISION, GENERAL MOTORS CORP.—Appointed sales representatives: Duane O. Brooks, Jacksonville, Fla.; Bruce C. Burdick and Melvin A. Hiter, New York; Henry M. Garvey, Chicago; Ivan E. Rice, San Francisco. Allan A. Michels appointed regional service manager at New York, succeeding W. A. Turner, retired.

ARCAIR CO. — Herbert L. Martin appointed field representative, central United States.





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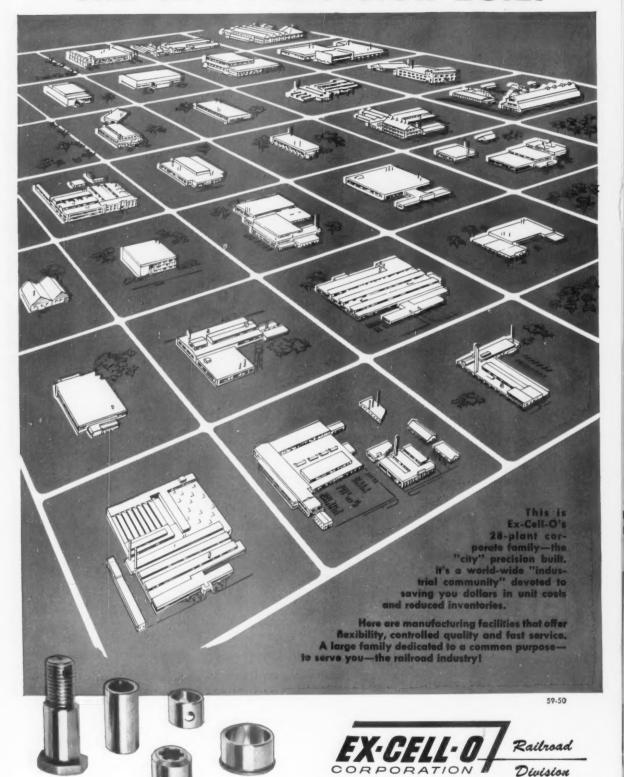
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TORONTO TRANSIT COMMISSION TENDERS FOR RAPID TRANSIT CARS FOR BLOOR-DANFORTH-UNIVERSITY SUBWAY

Seated tenders, endorsed "Tenders for Rapid Transit Cars for Operation in University & Yonge Street Subways" will be received by the Toronto Transit Commission at its office, 1900 Yonge Street, Toronto, until one o'clock p.m. Eastern Standard Time, on Monday 22nd day of August, 1960.

The work for which such tenders are invited consists of the construction and delivery of 40 to 50 Rapid Transit passenger motor cars (20 to 25 two-car units) for operation in trains of from two to eight cars, as specified in the Contract Documents.

All tenders must be made upon blank forms of All tenders must be made upon brank forms of tender as furnished by the Toronto Transit Com-mission and included in the Contract Documents, and shall be made in accordance with the provi-sions contained in said documents, and must be ac-

sions contained in said documents, and must be accompanied by a marked cheque, payable to the Commission, in the amount of \$125,000.

The successful tenderer will be required to furnish, execute and deliver to the Commission of Performance Band of 100% of the contract sum satisfactory to the Commission in the terms and within the time set out in the Contract Documents. The Contract Documents, including specifications, are available to tenderers at the office of the Toronto Transit Commission, 1900 Yonge Street, Toronto.

Toronto.

A deposit of \$100.00 is required. This deposit is refundable on return of Contract Documents in good condition within 30 calendar days after

opening of the tenders.

The Taronto Transit Commission reserves the right to reject any of all tenders without assigning a reason and does not bind itself to accept the

No tender may be withdrawn, after the sched-uled closing time for receipt of tenders, for at least forty-five (45) calendar days.

H. E. Pettett, General Secretary TORONTO TRANSIT COMMISSION

Toronto, Ontario

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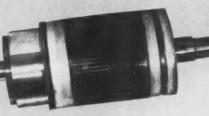
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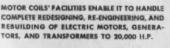
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